OrganicNZ

New Zealand's only organic gardening and lifestyle magazine

HAPPINESS FROM FOOD | HOW TO MAKE SOIL | MUSHROOMS TO FORAGE | ORGANIC WEEK AOTEAROA ...AND MORE

Soil carbon

The forgotten factor

Healthy soil, healthy food, healthy people

Oranga nuku, oranga kai, oranga tāngata.

MAY/JUNE 2023
NZ $9.90
ISSN 1175-5970

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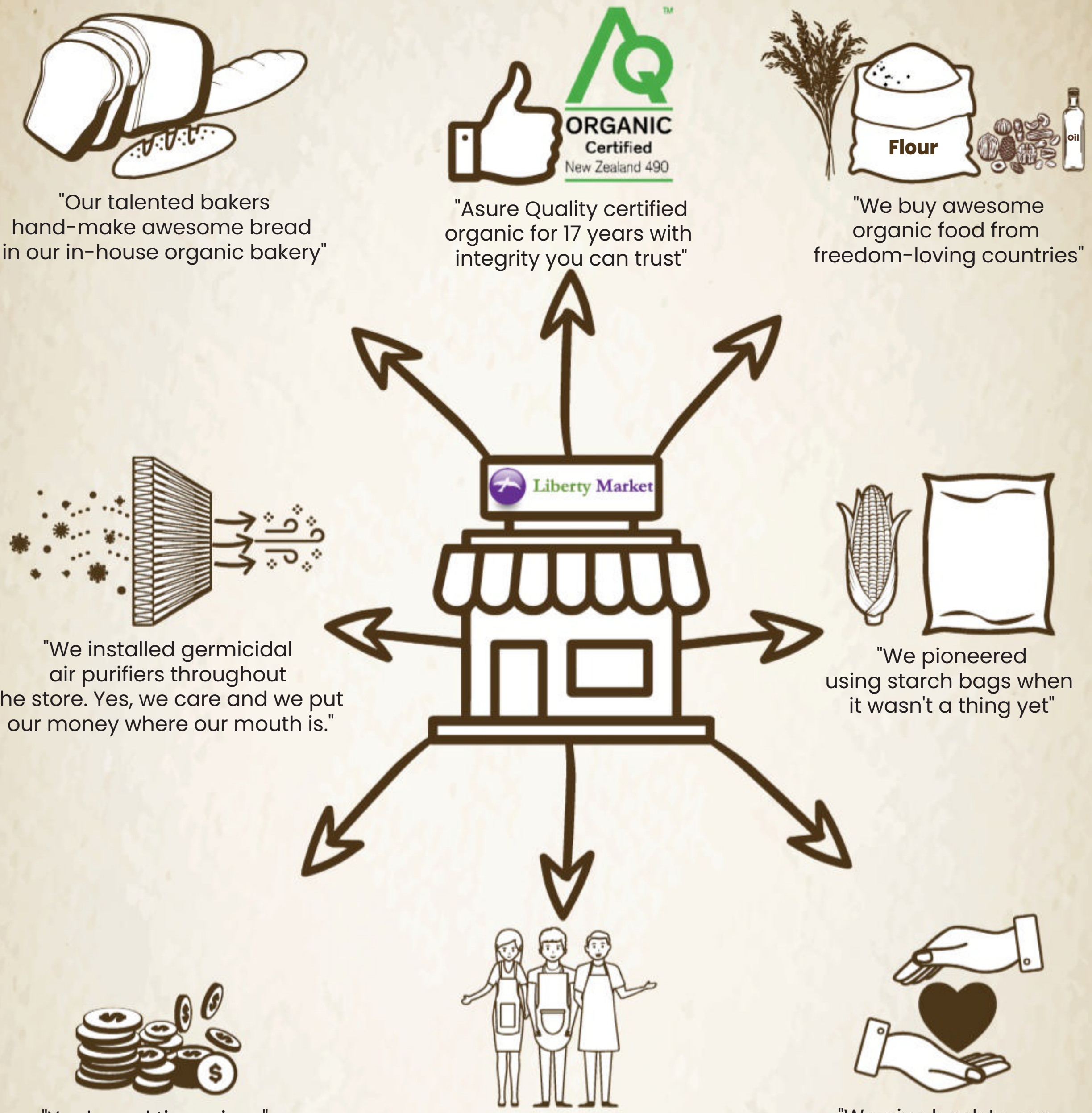

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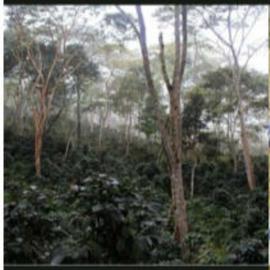

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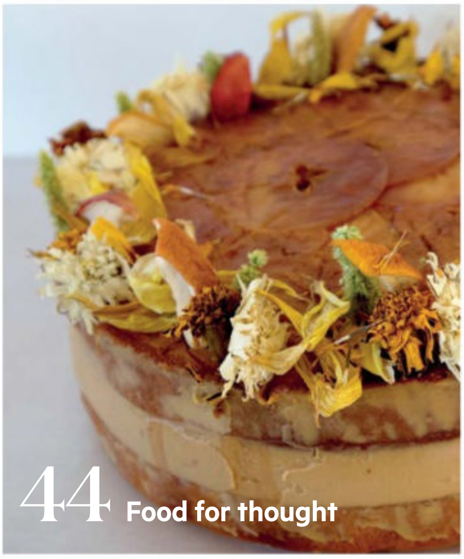
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Behind our cover

A visit to the wildlife sanctuary of Kapiti Island inspired Sam Lewry to stylize the landscape into the oil painting 'Island Shore' which features on our cover. Originally from the Kapiti Coast herself, Sam now works from her studio in the Rangitikei. Her art practice began in 2009 and has evolved into a meditative process, the solitude of painting providing a welcome escape from everyday noise and reflecting her deepening connection with the natural world. For more information about Sam's stylized and imaginative landscapes visit www.lewry.co.nz.

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New Zealand's National Arboretum, Eastwoodhill, is a stunning place to visit in autumn. Over 15,000 trees provide fabulous colour, a rich source of seeds, and habitat for interesting fungi, insects, and bird life.

PHOTO SHERYN DEAN

Soil & Health Association of NZ Inc, a registered charitable society established in 1941 to promote sustainable organic agricultural practices and principles of good health based on sound nutrition and the maxim "Healthy soil, healthy food, healthy people" – "Oranga nuku, oranga kai, oranga tāngata".
Soil & Health NZ is the owner of BioGro NZ Ltd.

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Did you know? Buying or subscribing to *OrganicNZ* supports the work of Soil & Health NZ, a not-for-profit registered charity, towards a GE-free organic Aotearoa.

Subscribe, save, enjoy home delivery, and exclusive prize draws.

Subscribe and sign up for our free monthly newsletter, *The Good Dirt*, at organicnz.org.nz (see page 7 for details).

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Accounting for the future

A recent article in a farming magazine[1], bemoaned that an estimated $55 million has been spent comparing organic/regenerative to industrial (named conventional) farming – with the conclusion that regenerative farming produced less profit and more GHG (greenhouse gas) emissions.

In the report[2] referred to, however, regenerative farming modelling had lower GHG per hectare (3.9 T CO2e/ha versus 5.0 T CO2e/ha), but industralised farming had higher production so it was calculated to have lower emissions per kilogram of product.

I have studied and practiced organic farming for many years and have repeatedly noted how clay and anaerobic soils can change into black, sweet-smelling loam in an amazingly short time – undisputable evidence of carbon being sequestered and biological life returning to the soil. I note the improvement every time I dig a hole. I sit down and count my worms and feel vindicated.
But soil carbon is not factored into New Zealand's GHG modelling or our national greenhouse gas inventory[3]. It is overseas, but NZ deems it too labour-intensive and expensive [4].

Also, as Dee Pigneguy pointed out in *OrganicNZ* Jan/Feb, 70 per cent of the world's methane is estimated to pass through the soil each year, coming into contact (in a healthy organic soil), with methanogens – microbes that digest methane. This closes the loop with ruminants (cows) in the methane cycle. It's another factor unaccounted for and unmeasured in the GHG calculations.

Organic farmers are well aware that everything, including gases, have a natural cycle and nature is complex with multiple factors and processes synchronised. Science has made tremendous discoveries in recent times, but their understanding of, and ability to measure, these processes is still limited.

The author of the original article, Dr Jacqueline Rowarth, (PhD and a Director of Ravensdown, DairyNZ, and Deer Industry NZ), concluded by asking "how agricultural scientists, researchers and rural professionals can swing their work back to where it can make a difference for the future – testing new ideas rather than confirming why the old haven't become mainstream".

I put it to Dr Rowarth that 'the old' organic practices were mainstream for centuries and it is only relatively recently they've been replaced with profit-focused 'new ideas' – which often prove to be detrimental to our soils, water, and climate. Charles Hyland details one on page 58.

We know through experience, application, observation, logic, and international research, that regenerative organic systems are the most sustainable. Page 62 outlines the advocacy Soil & Health NZ is making for this to be recognised. But then, Dr Rowarth's suggested 'new ideas' include pasture species (do I hear GM?) and methane inhibitors in cows. Conversely, it is hard to make money out of organics which is a process, not a product.

I suggest that instead of 'new ideas' developed without comprehension of the consequences, the focus should be on understanding what works (regenerative organics) and how to utilise this to the maximum advantage.

That is what will make a difference to our future.

For references pertaining to this editorial, go to organicnz.org.nz

Sheryn

Sheryn Dean, editor

Healthy soil, healthy food, healthy people –
Oranga nuku, oranga kai, oranga tāngata.

WIN this issue!

Look at these great prizes on offer to subscribers and readers.

Subscribe and read with chocolate!

Subscribe to *OrganicNZ* by 31 May to be one of three subscribers to win Swiss Bliss artisan chocolates! All current subscribers are automatically entered. Swiss Bliss will delight your taste buds with their organic chocolate which is handcrafted in Waitoki. The first prize is a large chocolate gift bundle, valued at $120. The second and third prize winners will each win chocolate gift bundles valued at $90. All bundles include gluten-free, dairy-free and vegan treats.

For nearly 20 years the folks at Swiss Bliss have been creating high quality chocolate products using only certified organic cocoa, by combining recipes collected from years spent in Switzerland with their local New Zealand ingredients.

www.swissbliss.nz

Treat your soil with organic love

Enter on behalf of your garden! DCT Garden are offering their five-litre Lazerhume soil conditioner to four lucky winners.

Lazerhume is a 100% natural soil conditioner containing humic, fluvic and ulmic acids, and is certified organic by Biogro. Humic and fulvic acids are both essential for healthy plants and soils, as they help to break up compact clays in your soil and free up nutrients, boosting water penetration and encouraging healthier root development. The five-litre concentrate will make up around 80 uses for your vegetable garden.

In March 2004, DCT was created with a vision that healthy soil equals healthy plants. They create innovative products that work with the soil to provide the nutrients plants need.

www.dct.co.nz

Read with coffee

Share the love of organics with a gift subscription to *OrganicNZ* and automatically go in the draw for a gift pack of IncaFé organic and Fairtrade coffee.

IncaFé have a delicious range of coffee beans, plunger, and ground coffees with different flavour profiles. They import direct from growers in Peru, sourcing coffee beans grown at high-altitude in organic rich soils that naturally sequester carbon. Or try their drinking chocolate and organic raw cane sugar.

www.incafe.co.nz

Stock up on quality organic flour

Bakers and bread makers, be in to win one of six $50 vouchers from Organic Flour Mills! Organic Flour Mills are committed to milling the finest flours from organic NZ-grown wheat, rye, and spelt, as well as organic gluten-free buckwheat, brown rice, millet and sorghum, all sourced from BioGro certified suppliers. Their Zentrofan cyclone air mills work by impacting the grain against the mill wall and cooling the flour, preventing any loss of nutrients and extending shelf-life. Newly released is their Bread Mix; simply add to your bread maker with salt, oil, and water, and enjoy the fine, light loaf of bread.

Organic Flour Mills is run by Lindsay and Jill Wright in Palmerston North.

www.organicflourmills.nz

How to enter
To enter the draw for any of these competitions, visit the Competitions page on our website. Competitions are open to New Zealand residents only. One entry only per person per competition is accepted. Read the full terms and conditions on our website. **Entries for all competitions close on 31 May 2023.**

Winners

Pure Bread vouchers Phoenix McClean, Puhoi; Bryan Lithgow, Auckland. **Bennetto chocolate prize packs** Fleur Black, Havelock North; Gena Moses-Te Kani, Hamilton; Toby Rosenberg, Carterton; Richard & Esther Burgess, Mount Maunganui; Alma Wicksteed, New Plymouth. **Be Natural Soap** Maxim Barnett, Auckland; Chloe Gibson, Christchurch; Lorna McKenzie, New Plymouth. **IncaFé Organic Coffee packs** Roydon Phillips, New Plymouth; Trudi Hoogerbrugge, Auckland; Carol Houghton, Nelson; Gael Powley, Geraldine.

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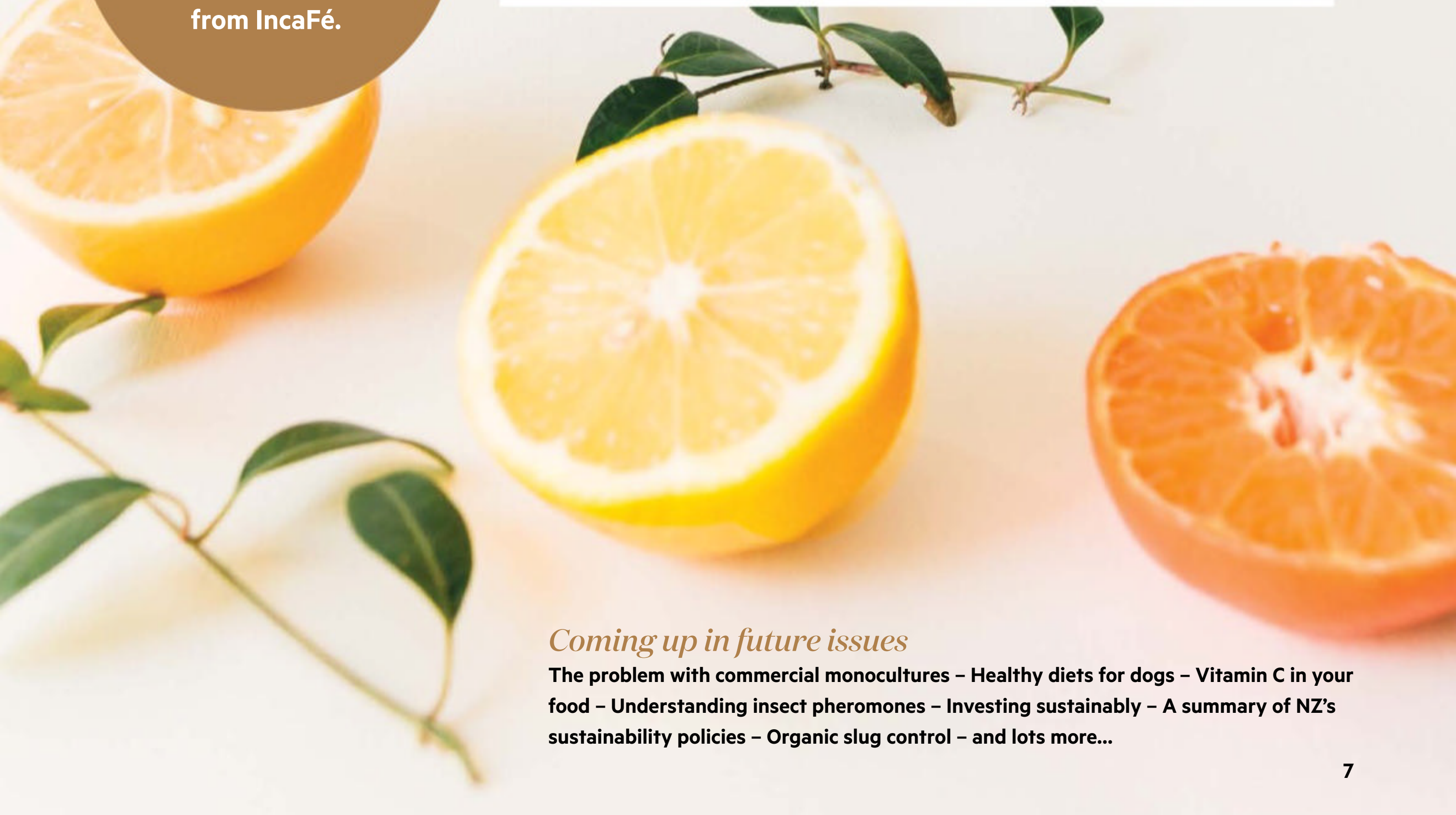
***OrganicNZ* subscribers are voting members of the Soil & Health Association of NZ Inc.**
Since 1941 Soil & Health NZ has promoted healthy organic food production, a GE-free New Zealand, campaigned against harmful chemicals, and provided funding for organic gardens in schools and communities.
Please also consider making a donation towards our work. Soil & Health NZ is a registered charity and donations $5 and over qualify for a tax rebate.



Coming up in future issues

The problem with commercial monocultures – Healthy diets for dogs – Vitamin C in your food – Understanding insect pheromones – Investing sustainably – A summary of NZ's sustainability policies – Organic slug control – and lots more...

Community garden

Every *OrganicNZ* magazine subscriber is automatically a member of the Soil & Health Association, New Zealand's oldest organisation promoting sustainable, healthy food. Soil & Health publishes *OrganicNZ* magazine and works with like-minded individuals and organisations to promote and advance our maxim of "healthy soil, healthy food, healthy people".

Notice of Special General Meeting: Soil & Health NZ

The National Council of the Soil & Health Association of NZ is calling a special general meeting of members, held at 10am on Saturday 3 June. The meeting is to discuss our work programme and includes a remit (decision item) to adjust the membership fee. The proposed increase in the membership fee is to cover the cost increases across our work programme in recent years. The proposed new fee is $90 per year.

For more information about the SGM including background papers, and to register, visit us online at www.soilandhealth.org.nz, or contact: manager@organicnz.org.nz

We're losing our Sally

Sally Travis is the graphic designer who has been assembling *OrganicNZ* into an attractive, coherent whole for the past ten years. We know there's always a time when life takes us in different directions but we're sad to see Sally go. She has been an integral part of our team. Thank you Sally, and take our best wishes with you into the future.

Benjamin Pittman

1948–2023

Dr Benjamin Pittman (Te Parawhau, Ngāti Hao/Te Popoto, Ngāti Hau, Ngāpuhi) sadly passed away in Te Tai Tokerau in February, aged 75.

In 2021 he was appointed an Officer of the New Zealand Order of Merit for services to Māori and the arts. His connection to the organic community was in representing iwi and hapū in the successful court cases to retain and strengthen local government GE-free policies in Te Tai Tokerau, alongside Soil & Health NZ, GE Free Northland, and others.

"Benjamin had great mana, was elegant, generous, and kind, but had a great bullshit detector," said Zelka Linda Grammer of GE Free Northland. "He was a very fine artist, a great friend, a dedicated conservationist and environmentalist, a highly effective lobbyist for GE/GMO-free, a cultural expert in various Environment Court and High Court cases – too many talents and valuable mahi to list here."

As chairman of Te Pouwhenua o Tiakiriri Kūkupa Trust Board – Te Parawhau ki Tai since 2016, he was involved with a UNESCO research project on soil health, regenerative farming, and tikanga-based practices, in partnership with Auckland University of Technology and NorthTec.

Soil & Health NZ and GE Free Tai Tokerau both extend deep sympathies to Benjamin's family and friends.

Whakapiri ki te tini me te mano, e kore te aroha mau e mimiti.
Though you have gone, our love for you does not diminish.

Landmark day in Parliament for organics and the organic community

The organic community are celebrating the passing of the Organic Products And Production Bill in Parliament on Thursday 30th of March.

This law has been many years in the making and provides a legal backstop to prevent greenwashing of organics and ensures market access for exporters. Tiffany Tompkins, CEO of Organics Aotearoa New Zealand (OANZ) said the new law is driven by growing demand for organic products both here and overseas. "It will provide certainty for consumers in this country that what's being labelled and sold as organic, meets this standard."

"Consumers want safe, healthy food with high animal welfare standards, that regenerates the land and waterways and mitigates climate change. Organics ticks all those boxes."

"Having a national organic standard that's recognised by government will help market access to existing and new overseas markets," she said.

FROM LEFT Marion Wood, Gareth Hughes, Brendan Hoare, Eugenie Sage MP, Hon Damian O'Connor MP, Teanau Tuiono MP, Tiffany Tompkins, Claire Bleakley, Rick Carmont, Donald Nordeng.

What happens next?

There is still a lot of work to do on nailing down the New Zealand standard. This work is being led by MPI with support from an Organics Sector Advisory Council which includes representation from Soil & Health NZ.

MPI are checking the content with experts in Animal Welfare, Assurance, and Food and Fisheries and there are opportunities for the public to get involved and provide feedback on these draft proposals over the next couple of months.

More information can be found on the MPI website under 'Changes to organic products law'.

Talking trees

Three and half years into the $16.5m Resilient Forests Research Programme (designed to 'ensure the long-term economic, environmental and social sustainability of forestry by creating forests that are more resilient to the impacts of climate change'...), Dr Tim Payn, Principal Scientist of government-owned Scion who run the programme, commented: "The challenges facing communities affected by Cyclone Hale and Cyclone Gabrielle in recent weeks have rekindled important discussions about forestry practices and the impact that forestry slash and storm debris is having in regions hardest hit by adverse weather events."

To be sure, those who have been devastated by the effects will be pleased they have started to talk about it.

Save For The Love of Bees

For nearly eight years For The Love of Bees has been creating spaces that model regenerative organic horticulture in Auckland city and inspiring us to imagine a more biodiverse and climate-ready future.

But they have recently lost a core source of funding, which puts their not-for-profit and leading urban farm on Symonds Street at risk of folding. You can support them by pledging $12 a month through their membership drive at fortheloveofbees.co.nz. They are also looking for business and private sponsors.

Your Feedback

Positively carbon

A substantial amount of carbon gets into the soil via plant roots.

Such ‘negative emissions’ are essential to keep global warming below 1.5 to 2°C.

Because some processes, especially in industry and agriculture, cannot be completely decarbonised, CO2 must be withdrawn from the atmosphere to compensate. This is what plants do. They use water, sunlight, and CO2 to form biomass. If the biomass rots or burns, the CO2 is cycled back into the atmosphere, but if it is converted by microbes into humus, it is stored in the soil.

This simultaneously improves soil fertility because of the increase of nutrient-rich humus, increases water storage capacity, and counteracts erosion.

Soils round the world have the potential to absorb so much additional carbon that a third of today’s man-made CO2 emissions could be reversed.

Biospheric carbon sinks and sources can be included in emission reduction targets. Forest management, crop-land management, grazing land management and re-vegetation are allowable activities under Article 3.4 of the Kyoto Protocol.

Given this, carbon sequestration should form a central role in any portfolio of measures to reduce atmospheric CO2 concentrations. Given that improved agricultural management often has other environmental and economic benefits, such win-win strategies should be implemented as part of integrated sustainability policies.

The increase of carbon sequestration through more growth, especially through cover crops and crop rotations with deep rooting varieties (especially legumes) is essential.

At the same time, soil and plant health inputs must be based on sustainable resources. Most certified organic inputs are sustainable, and all biodynamic preparations are based on plant extracts, cow dung, and the mineral silicate.

Let us be positive and face the challenges of change with hope and skill.

ANDREAS WELTE
ECOGRAPE LTD
NELSON
BioGro NZ certified grower and adviser to the organic and biodynamic farming industry.

Ant invasion

In November last year I had the most terrible ant invasion. The ants were marching in, forming nests on the walls and heading for my pantry. They were coming in through various crevices in my 1964-built kitchen.

I had to depart from the essential oil spray I’d made up a few years ago when ants started becoming a problem. First I used a Mortein spray from the supermarket. This helped a lot, but the ants just kept on coming, so I had to have professional ant control done on my house. I didn’t want the company to fumigate the interior, but I did have a pesticide dust blown into the roof space, and a pesticide barrier sprayed around the house which they spray about 30cm up the exterior walls and on the ground. Apparently, the ants go outside to feed if they can’t find any food inside, and they walk over this barrier spray and take the poison back to their nest on return.

This put paid to the problem until February, when I again had what felt like ‘trillions’ of ants coming in, and I had to repeat the spray process.

I’m wondering if there is any advice you can give me about how organic-minded folk control ants? I know about keeping the kitchen clean and not leaving any food or water out for them, or even a coffee jar as they will pick up the smell. And as I said, I have an essential oil spray, which I made up myself after researching the internet, which immobilises or kills ants on contact, but which doesn’t destroy a nest that may have formed in the walls or roof or underfloor of the house.

Is there anything else I can do?

ELIZABETH SAVAGE
KAPITI COAST

Recipe fail

I just made the recipe from the March/April *OrganicNZ*, Tempeh Walnut Roast.

It is completely inedible. I bought all ingredients and stuck to the recipe completely.

I wonder if the quantities were not right? The yeast flavour was overpowering. Nutritious yeast has a very powerful taste and it also had stock and miso, so plenty of saltiness which totally overpowered the walnuts, mushrooms and tempeh. Anyway, it is going straight to the chooks.

Buffy Ellen Gill must have totally different tastebuds, or whatever... she advertised it as a very wonderful bake, a celebratory centrepiece!
Thank you, I do enjoy the magazine !!

ANNELIES PEKELHARING

How disappointing! Yes, the quantities were exactly as published in the Be Good *recipe book. What were other reader's experiences?*

To compensate Annelies, we are sending you a $50 voucher to spend on your choice of nutritious, organic, baked goods from our generous sponsor, Purebread. We know they will be good!

Celebrating womanhood

I'm always in favour of menstrual articles. It's a shame there was no mention of the momentous rite of passage of our precious maidens that should be celebrated and will in turn help break the patriarchal shame of blood rites. Mark the first blood of your daughter with a party, in the garden with friends and elders, make it celebratory so she sees the gift of entering womanhood.

Also, menstrual cups aren't for all, they can be painful so don't persevere. Organic cotton tampons can be composted very well. And free bleeding is medicine, on the earth and resting, as women should be doing, with their sisters. Love your blood!

KATE MELZER
WAIKAWA, PICTON

Get in touch

We appreciate you sharing your opinions and views.
Send your feedback (less than 300 words) to editor@organicnz.org.nz along with your name and address by **20 May 2023** and be in to win $50 worth of great-tasting organic foods from our generous sponsor, Purebread.

NZ's **tastiest organic** bread & baked goods!

In this time and era, it's never been more important to be aware of the food we eat and make the shift to organic, pesticide-free products - BioGro certification provides a guarantee and confidence in your purchases.

Our network of stockists across the country is growing so keep an eye out for our products at your local supermarket or browse and order our range of organic breads on our website!

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An Organic Week to remember

Organic Week is Aotearoa's largest annual celebration of all things organic. Brought to you for the fifth year, Organic Week unites the organic sector to increase knowledge and further a better environment. You are invited to join.

1st May marks the start of Organic Week 2023, a national campaign designed to elevate knowledge of organics through a series of events and promotions hosted across the country.

Organics is on the rise globally and nationally and has the potential to transform our agricultural sector to one that is genuinely regenerative. Organic Week provides a platform to elevate the farmers, producers, and suppliers doing the mahi for a better tomorrow.

Read on to find details of the online and in-person events you can get involved in and more about the wonderful people behind the scenes.

Organics is climate action

This year, our theme is 'organics is climate action'. The goal is to raise awareness of the benefits of organic farming as a solution to climate change and empower people to make small changes that collectively make a big difference. This is the focus of our two online panel discussions, 'Transforming Farming in Aotearoa' and 'A Guide to Organic Living During the Cost of Living Crisis,' with our expert panel bringing their real-world knowledge of organics and solutions for the future.

"We are living in a time of climate crisis. Our planet is warming, and our weather systems are causing chaos in our communities and food systems.

"With 50 per cent of Aotearoa's greenhouse gas emissions coming from agriculture, how we farm can make or break the health of our biosphere. The good news is that organic farming is climate-friendly and could even counteract climate change if practised on a large enough scale.

"Some truly exciting research is now showing that shifting to organic regenerative farming practices could counteract climate change on a global scale. Organic Week is a platform to showcase good news stories ignite conversations, encouraging everyone to make small changes that hopefully lead to bigger impacts.

"Join us this May to celebrate Organic Aotearoa, share our stories, and help us make some noise."
Organic Week coordinator, Lou Vicente.

Organic Week Events

Check out what's happening and get involved, with all events open for registration on the Organic Week website.

Online webinars – Free to join

Panel Discussion: Transforming Farming in Aotearoa
Live via Zoom, Thursday 4 May, 12 - 1 pm

Hear from our expert panel on how to encourage farmers to transition to organic regenerative practices in the face of today's climate challenges. The panel includes Christine Rose, Charles Hyland, Noel Josephson, Rachel Short, and Kaitlyn Lamb.

Panel Discussion: A Guide to Organic Living During the Cost of Living Crisis
Live via Zoom, Friday 5 May, 12 – 1 pm

Hear from business founders and owners on how we can change our consumption habits when the perceived cost of organic is so high. The panel includes Robyn Guyton, Ben Elms, Sol Morgan, Nicola Galloway, and Alex Morrison.

More Organic Week webinars and workshop are listed online
organicweek.org.nz

Organic Week presents Organic Perspectives: A day of organic talks to remind and reconnect us to our living world
Live via Zoom, Saturday 6 May

11 am | Noel Josephson, Ceres Organics – Our relationship to the natural world

12.15 pm | Philippa Jamieson, former editor of *OrganicNZ* – GE Mythbusting Session

2 pm | Liv Sisson, author – Fungi of Aotearoa (plus book giveaway)

Our Methane Moment: Greenpeace Climate Campaign
Live on Zoom, Tuesday 2 May, 6.30 pm

Greenpeace shares the case for ending big dairy and transforming agriculture. The webinar will cover why Greenpeace is hopeful for the future of food, and what we can all do to help bring about the transformation of agriculture.

Regional events – tickets available online

AUCKLAND

Awaawaroa Eco Village Field Day
182 Awaawaroa Road, RD 1, Waiheke Island | Friday 5 May, 10 am to 2pm.

Walking tour of the Eco Village, including the tree nursery and an adobe earth brick house. Morning tea provided.

WAIKATO

Loyal to soil workshops with Dr Christine Jones
Jet Park Hamilton Hotel, 201 Airport Road, Hamilton 3282 | Tuesday 2 May, 9. 30 am – 3.30 pm
Wilith Farm, 2212 State Highway 30, RD 1, Atiamuri 3078 | Friday 5 May, 10 am – 4 pm

AgriSea New Zealand, alongside Rere Ki Tua Rere Ki Tai, invites you to learn about significant insights into the role of soil biology for fixing nitrogen, preventing leaching and raising farm profitability with leading Australian pasture ecologist and carbon farming expert Dr Christine Jones. Price $95.

WELLINGTON

Composting 101 with Kaicycle
5 Hospital Rd, Newtown, Wellington | Saturday 6 May, 9 am – 12.30 pm

Join Kaicycle for their hands-on workshop on all things compost! $75, with some reduced-price tickets available.

Portable Salad Garden workshop at Common Unity
The Remakery, 310 Waiwhetu Road, Fairfield, Lower Hutt | Saturday 6 May, 10 am – 12 pm

From this hands-on workshop you will plant and take home a fish-bin garden. Keep it by the kitchen door for an endless supply of fresh salad greens. Learn how to make your own paepae garden, using our rich organic compost, and salad greens of your choice. The workshop is led by Hannah Zwartz and her 30 years of gardening experience, $75. Free volunteer events are also happening during Organic Week, you can check them out online.

CHRISTCHURCH

What is Regenerative Agriculture? With Sam Lang and BHU
Lincoln University, Christchurch | Tuesday 2 May, 9 am.

All are welcome to this free, informative seminar about regen ag and its key benefits from Sam Lang, a Canterbury farmer and founding member of the farmer-led Regenerative Agriculture group Quorum Sense.

OrganicNZ Awards '23

The OrganicNZ Awards are a wonderful part of Organic Week, where we present eight awards to well-earned champions of organics.

The eight awards are split into two categories; Peer Reviewed and Peoples' Choice. Finalists for the Peer Reviewed awards were chosen by a panel of organic leaders, and Peoples' Choice nominations are waiting for your vote. Go to the Organic Week website to vote for your pick.

Get tickets to attend the awards night in Wellington on Thursday, 4th May, 5.30 pm at the Taranaki Wharf Boatshed ($59), or watch virtually through the Organic Week website - **organicweek.org.nz**

PEER REVIEWED AWARD FINALISTS

Brand of the year

TranzAlpine Honey
TranzAlpine Honey are a fifth generation of family beekeepers, certified organic, and committed to the health of the environment. They are constantly innovating to reduce their impact in order to produce healthy food without compromising future generations' ability to do the same. TranzAlpine Honey account for 68 per cent of all certified organic New Zealand honey exported to the EU annually.

Karma Cola
Karma Cola are on a mission to be the world's most ethical soft drink. They aim to connect consumers with farmers and growers in a way that respects everyone and everything involved. They are proudly certified organic by the Soil Association (UK), and have an impressive list of achievements that started in one village in Sierra Leone and is now across eight communities, impacting 3,000 people.

Roots, Shoots and Fruits
Roots, Shoots and Fruits provide organic fertilisers and nutrition products alongside education and scientific trials to combat incorrect assumptions about organic products. A recent success has been the Home Gardening range, to let a wider audience see what commercial growers had been using for decades to grow the biggest, brightest, juiciest produce.

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Vote online for OrganicNZ Peoples' Choice Awards

Go to organicweek.org.nz to view the award nominees and vote for your favourites.

A full list of nominees and online voting is available until May 2nd in the following categories:

- Food product of the year
- Beverage of the year
- Non-food product of the year
- Community garden of the year
- Farmers' market of the year

EMERGING LEADER OF THE YEAR
OrganicNZ Awards '23

Emerging leader of the year

TRANZ ALPINE
SINCE 1910
HONEY NZ

Jamie Tucker
Jamie has been instrumental in setting up the BHU Organic College Market Garden. This project is dedicated to educating future farmers and backyard growers in agroecological and regenerative farming methods. Jamie has been described as an incredible mentor, whose patience is matched by her enthusiasm, knowledge, and tirelessness.

Brittany Stembridge
Brittany is a member of Organic Farm New Zealand (OFNZ) and runs TomTit Farm, producing a wide range of market garden produce for the Hamilton community. Brittany completed the Earthworkers Regenerative Horticulture course (2021) and is 'walking the talk' on climate action and sustainability through food systems. Brittany has been described as a leader and influencer of a new generation of organic regenerative growers.

FARMER OF THE YEAR
OrganicNZ Awards '23

Organic regenerative farmer of the year

Biolchim
Concimi speciali

Jenny Lux
Jenny runs Lux Organic, a certified organic farm. Jenny has been nominated for the regenerative organic methods used on her farm such as polycropping, no tilling, no-dig gardens, and composting all farm 'waste' which is used back on the whenua.

Coral Remiro
Coral is studying soil ecology through the Soil Food Web School and works at Earth Stewards Certified Organic Urban Farm. Coral has been nominated for her work researching and implementing trials to improve soil biology. Soil health and climate change mitigation is the total long-term focus of her operation.

Ryan Fraser
Ryan works at Paritua Vineyards in Hawke's Bay which is in its second year of fully organic management. Ryan has been nominated for his work protecting biodiversity on the vineyard and his work in the wider community to improve the river catchment environment.

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Organic Week
Aotearoa

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countdown

As one of New Zealand's major suppliers of fresh fruit and vegetables, Countdown is committed to meeting New Zealand's ever-growing demand for quality organic produce. Their range offers customers a wide selection of organic produce.

Countdown works hand in hand with suppliers like Bostocks in Hastings, Otago's Central Organics, Southern Cross Produce in Christchurch, Orewa-based OOB, Monavale Blueberries, and many more throughout New Zealand to provide their organic produce. These are growers whose methods demonstrate their dedication to the protection of the land they farm—proof of which is the quality of the produce they provide.

Countdown's head of produce, Ryan McMullen, believes that Countdown offers value to both the grower and consumer through their organic certified packhouse, supply chain, and retail network.

"We are excited by the opportunity we have in the organic category. However, while Countdown is the largest organic retailer in New Zealand, we are far from satisfying the demand. Our focus for this year is to work with growers to increase the availability and consistency of organic produce in New Zealand."

With Countdown's commitment to growing their organic offering, their fresh produce range aims to provide the finest sustainably produced, soil friendly, pesticide-free fruit and veges for every consumer—fresh every day. And for organic favourites at affordable prices, Countdown's organic range currently includes potatoes, carrots, apples, blueberries, and kiwifruit.

Gold

Fonterra Organic

Biolchim
Concimi speciali

TranzAlpine
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HONEY NZ

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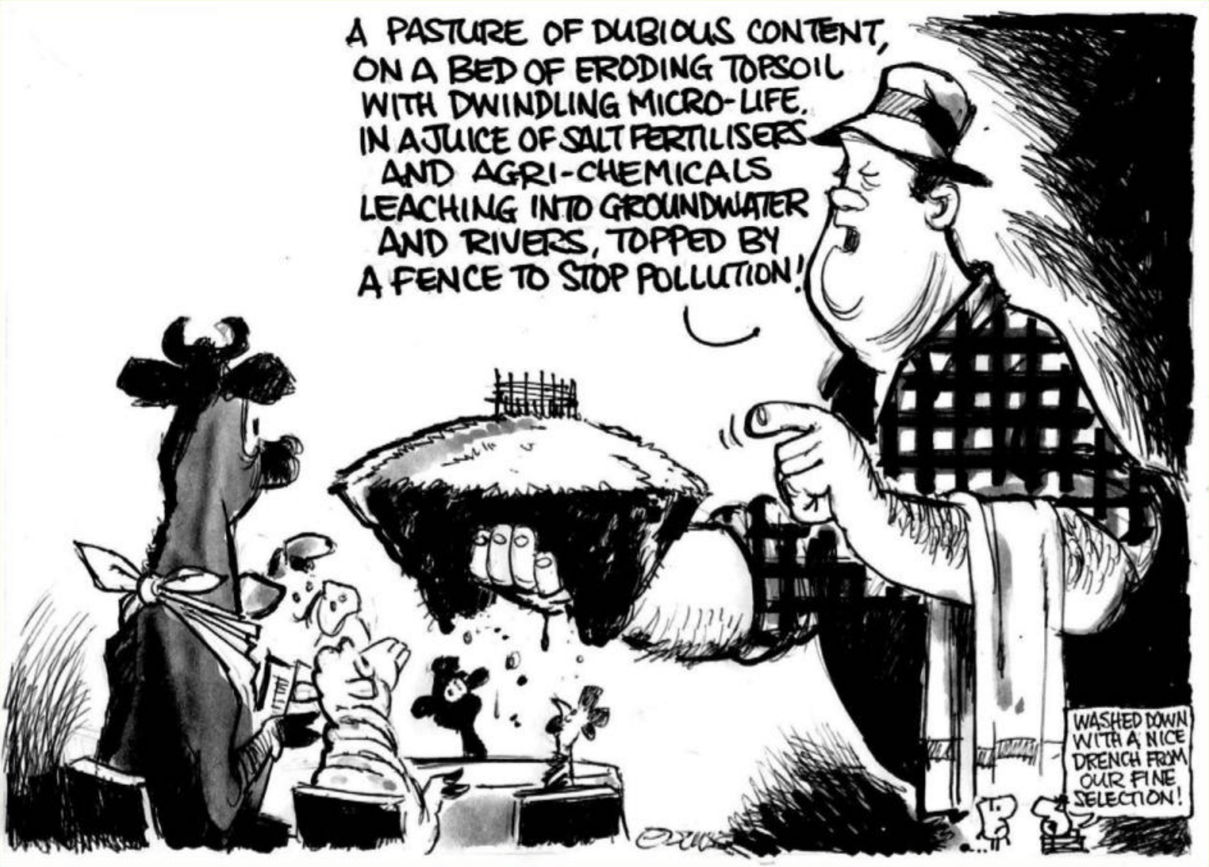
A PASTURE OF DUBIOUS CONTENT, ON A BED OF ERODING TOPSOIL WITH DWINDLING MICRO-LIFE, IN A JUICE OF SALT FERTILISERS AND AGRI-CHEMICALS LEACHING INTO GROUNDWATER AND RIVERS, TOPPED BY A FENCE TO STOP POLLUTION!
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Banana plants growing on the slope of the bund one metre behind the swales. Bananas reach into the swale for some of their nutrients and pumpkins grow spontaneously from the food scraps.

MAKING SOIL

Turning food scraps into food production

A climate action enterprise uses bokashi and no-turn composting methods to create carbon-rich, nutrient-dense soil. **Theresa Sjoquist** talks to those who are diverting landfill to profitable crops.

Betsy and David Kettle of City to Farm collect food scraps from commercial kitchens in Auckland and ferment them in bins by the Bokashi method.

Regenerative farmers Phil and Jenny Grainger compost the results to grow organic bananas and pumpkins. It's a win-win for them and a big win for the environment.

"How we grow food and dispose of food-waste is a huge contributor to climate change," says Betsy.

More than 150 tonnes of food scraps have been diverted from landfill into high-value food production on the Grainger's 32-hectare farm at Waitoki, Rodney, simultaneously preventing greenhouse gases escaping into the atmosphere and sequestering carbon into the soil.

Sourcing scraps

City to Farm meets with commercial kitchens to assess the quality and quantity of scrap output. Raw dough, liquids, fats, oils, large bones, compostable serve-ware, plastics, and bioplastics are off the menu.

City to Farm supplies 15L buckets or large wheelie bins with a layer of biochar and mulch in the bottom. The kitchens layer the food scraps with a sprinkle of Zing, a microbial inoculant to create a bokashi fermentation system.

The woody mulch keeps the scraps out of the liquid generated by the fermenting process which drains to the bottom of the bin or bucket, reducing odours.

Bokashi is an anaerobic method of reducing food-scraps by fermenting rather than rotting, which generates microorganisms to break the scraps down faster.

Scraps to soil

The scraps are collected weekly and held in bins to ferment for two weeks before being spread between layers of biochar and woody mulch into swales on the Grainger's land.

> *Swales are landforms with a ditch and bund (hump) at the edge of a terrace that catch and trap rainwater so it soaks into the ground without running off.*

The bokashi and mulch begin to compost, with the layer of biochar beneath being critical to the process.

> *Biochar is a charcoal of untreated timber or plant matter created by an oxygen-excluded burning process known as pyrolysis.*

Biochar absorbs water and nutrients and improves soil structure and drainage. Once inoculated with microorganisms and charged with minerals, biochar is considered to be a permanent form of compost in the soil and is often utilised as a mode of carbon-fixing. It also tends to be alkaline, offsetting the acidic bokashi process.

Soil vs compost

Phil Grainger is a member of the Kaipara Regenerative Farming Group and explains the process has multiple benefits.

"Food scraps require low inputs so chemical costs don't exist.

"Combining anaerobically bokashi-fermented food-scraps with biochar and placing it in an aerated system kick-starts the microbial diversity necessary to begin rapid plant growth, and as a result, soil transformation occurs. The rapid soil transformation creates an extremely stable form of carbon and establishes diverse fungal species, including arbuscular mycorrhizal fungi.

ABOVE Ripening bananas on the Grainger's regenerative farm at Waitoki.

SPICE - Static Pile Inoculated Compost Extension

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"The combination of swales, improved water infiltration, and groundwater storage, enables the bananas to be grown with minimal irrigation, and the enhanced biology of the soil and ability of the fungi to unlock the minerals which feed the plants, which the cows then eat, is all symbiotic. You can afford to run fewer cattle, and the land is more drought resistant. We've also used the Johnson Su and SPICE compost systems to inoculate the land."

Johnson Su

The Johnson Su composting method also focuses on nurturing the micororgnisims in compost - using a bioreactor to provide oxygen.

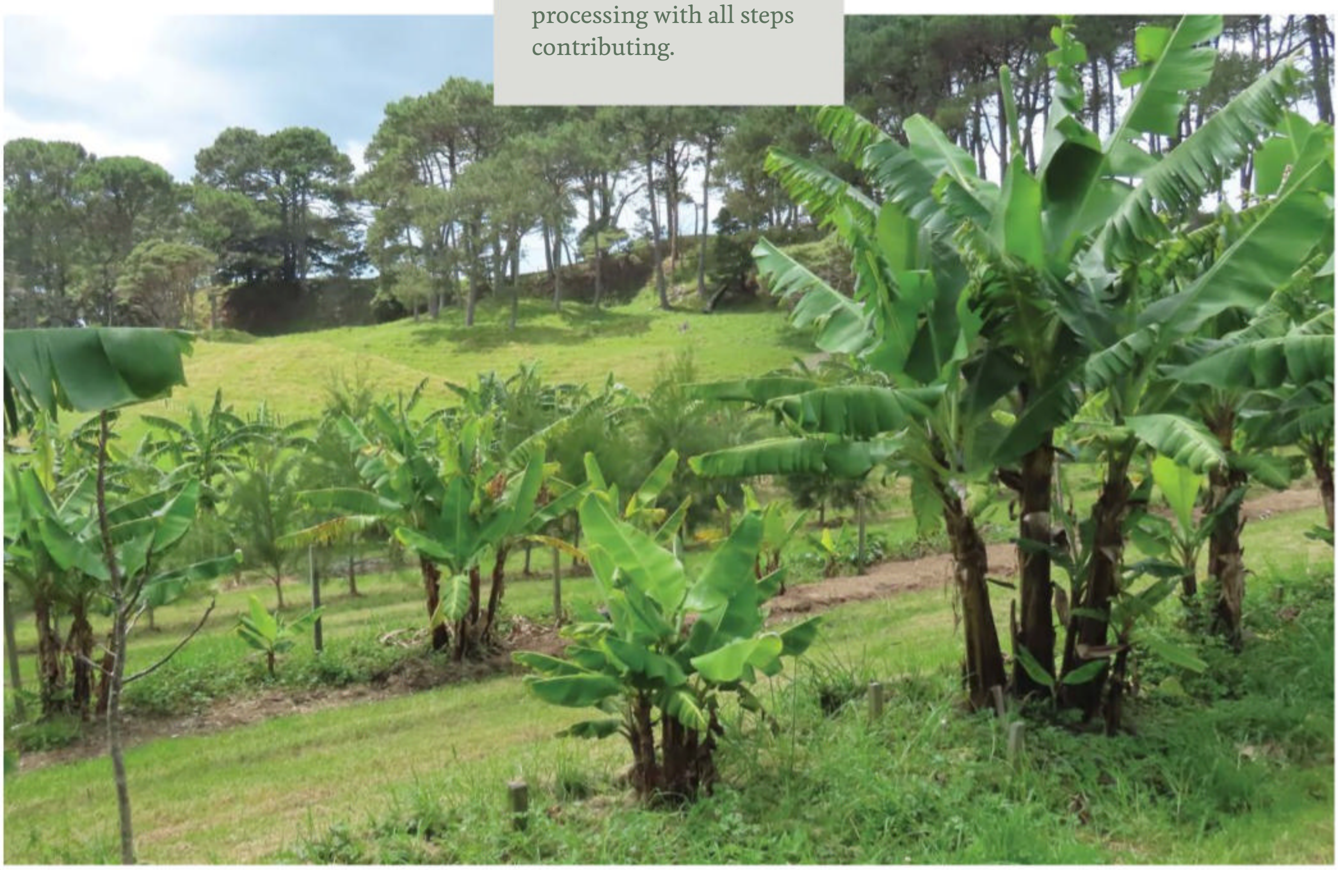
Conventional compost-making laws

When looking to make conventional compost on a commercial scale, resource consent could be a limiting factor. In Auckland in a Rural Production Zone, on-site composting is limited to 50m³ at one time. Amounts beyond 50m³ require an Assessment of Environmental Effects (AEE) due to potential overflows and odours.

Food scraps

- Bokashi fermented
- Swale composted
- Digested by worms
- Equals soil

Residual chemicals are broken down in the composting processing with all steps contributing.



TOP Dave and Betsy Kettle at the farm checking over the bokashi composting food scraps.
ABOVE Banana swales on the Grainger's regenerative farm at Waitoki. Note the young Casuarina shelter belt two rows back.

ABOVE Fruiting bananas with a shelter belt growing behind.

David Kettle says that City to Farm moves their compost through constantly creating an enriched mulch that worms work into the soil. The food scraps are completely broken down after six to ten weeks and the swales can then be reloaded. Bananas grow on the edge of the bund drawing some of their nutrition from the swale. The swale compost is never turned, thus enabling carbon sequestration.

Costs and Benefits

"Keeping food-scraps out of landfill," says Betsy, "and using them to build topsoil, creates a carbon sink that improves the soil and enables horticultural crops instead of pine trees and cattle."

Vermin on the farm is controlled by bait stations and traps, but Phil and Jenny say it's no worse than on other farms.

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The City to Farm enterprise has been assessed carbon neutral by Massey University and will be carbon-negative once the banana crop is sold, as it will replace imported bananas.

Phil Grainger adds that it makes economic as well as environmental sense. " I can run one cow on a hectare which will return between $500-$1000, but the 0.2ha on which I currently have 150 banana plants with a theoretical crop of 2,250kgs will sell at the market for $5/kg or wholesale for $2/kg, resulting in an income between $22,000 and $56,000 per hectare.

"We still need to determine if the banana sheltering will be sufficient to produce that crop. In the last five years we have seen a fixed predominant SW wind become more NW and NE and have had to adjust shelter belts accordingly, but the plants are growing well. After Cyclone Gabrielle, the bananas were fine, because they originate in cyclone-prone environments. The leaves are shredded but as soon as the wind stops a new leaf appears."

Other crops can be grown using this system, but it is especially suited to bananas as they are luxury feeders requiring lots of nutrients, and New Zealanders love them, eating the most bananas per capita in the world. And unlike imported bananas which have to be fumigated, these bananas are organic.

Phil has also noticed a substantial improvement to the water flow. "Food-scraps have changed the soil structure which started as hard clay and is now more porous with 25-30 times the infiltration rate, and with far more groundwater storage on previously hydrophobic land. The little stream that dried up all the time now flows all year round."

City to Farm currently pays $300 for 12m³ of untreated wood mulch from a local mill and $200 per 1.5m³ of raw untreated biochar. Storage, on-farm fermenting, and maintenance of the swales are covered by the Graingers, while collection costs are borne by City to Farm. However, it is expected that as the climate-challenging enterprise grows, some costs will be handled differently.

Limits to expansion

Betsy and Dave seek more carbon farmers to work with but have yet to exhaust the capacity of the swales on the Grainger's farm.

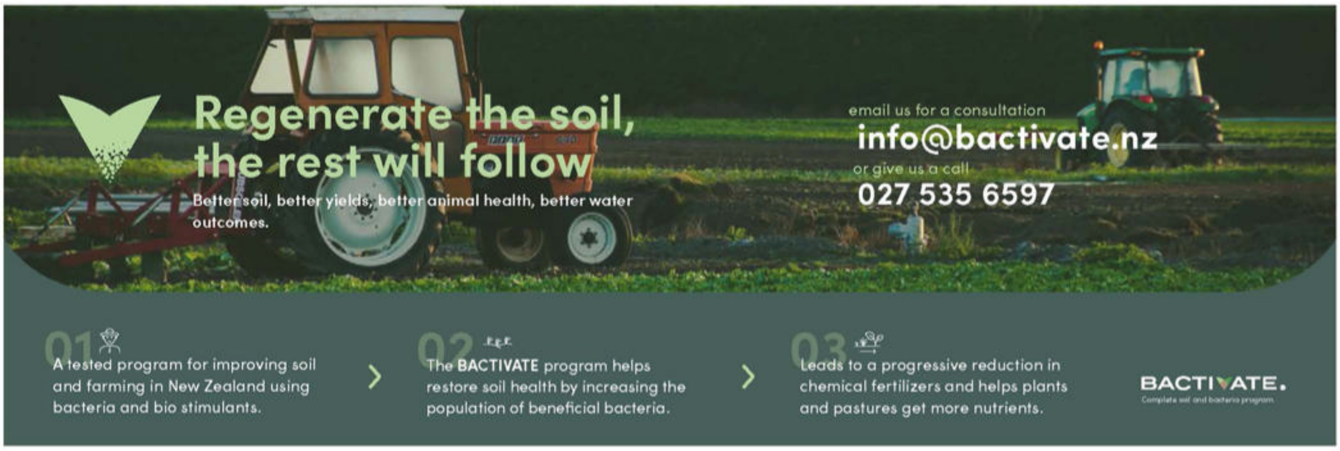
ABOVE Jenny and Phil Grainger who partner City to Farm.

"We can see farmers in the future getting carbon credits and becoming the champions of climate action," says Betsy. "Our biggest limitation really is the small number of people who understand the value of growing soil carbon and are willing to support the system in these early stages."

She says banning food-scraps from land-fill has been talked about by government but hasn't yet been implemented.

Currently food-scrap contributors to City to Farm include retirement villages, cafes, brewers, and early childcare centres and schools which incorporate the project as part of their education.

Theresa Sjöquist is a freelance writer based at Port Albert. www.theresasjoquist.com



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Conquer the cold

Seasonal gardening tips and tasks

With autumn settling into winter, what better advice than turning to the sun and letting the shadows fall behind you could gardeners take? Especially those who have lost so much in recent weather events.

For those whose gardens have weathered the storms, or thrived in the southern warmth, the frantic rush of picking and processing is over; it's time to wrap up the harvest for the year, cosset the edibles we still have in the beds, and most of all, look to the future with fruit, nut and berry bush plantings. If you are picking yourself up after the terrible impact of cyclones, there may even be a spare moment to engage in some 'instant' gardening to lift the spirits. Wherever you are in the country, make the most of the little heat that still lingers, by trapping it in cunning ways.

Kia whakatōmuri te haere whakamua –

Turn your face to the sun, let the shadow fall behind you.

PHOTO KEITH OLSEN

Collect in the climbers

While the main harvest may be over, many gardeners still have peas and beans on the vines. Left where they are, the pods will grow damp, fungal disease will set in, and the crop will spoil. Unless you live in a dry part of the country, snip the harvest off the vines, and hang it undercover (such as in a shed or garage) to finish drying. Leave what's left of the vines on their supports (if you try to tug them off, you'll only damage your infrastructure). Over winter, the remains will wither and crisp-up, at which stage you can crumble them back onto the garden to feed the soil.

Ways to warm-up!

Soil, rather than air temperature has the greatest impact on plant growth, so as the days begin to cool down, it's important to warm up the beds before sowing or planting into them. Wet soils won't warm easily, but in my garden, I have a head-start on heat with built-up beds that drain quickly. In autumn, I also weed the beds and rake back any mulch to allow the sun to penetrate the soil. Then, I harvest heat by laying plastic over the soil. Black plastic or clear plastic – either will do – but I make sure it's held down at the edges with bricks and long boards. This stops the plastic flapping up, and prevents the heat escaping. After a week or so of this treatment (in fine weather), the soil is ready to receive seeds or seedlings. When they're in place, I pop a cloche over the top to maintain the soil's warmth.

Seasonal sustenance

There's nothing more satisfying than preserving summer produce, and over the years, I've done a lot of just that. More recently, however, I've decided that it's more sustainable (and in some cases, more healthy) to eat seasonally instead. Eating seasonally avoids using valuable time and electricity, to freeze, bottle, or dehydrate. It also does away with the need for sugar and vinegar. To eat seasonally, I focus on growing cold-hardy greens throughout winter and early spring. I rely on root crops in the ground, as well as those that I have dug and stored in autumn. I draw on naturally cured and dried edibles such as pumpkins, kumi kumi, nuts, peas, beans, and grains, and I get my sweetness from winter berries (such as ugni), carefully stored heritage apples, honey, and sweet pumpkin. I save my active preserving for a few jars of chutney and some bottled non-keeper apples. Preserving can be fun, but it's not always necessary.

OPPOSITE When searching after dark for slugs and snails, don't forget to check the back of leaves.

ABOVE RIGHT Storing naturally dried garden produce can be a more sustainable and less time-consuming way of preserving the autumn harvest. Keep it in rodent-proof containers along with sachets of food-grade desiccant to absorb any moisture.

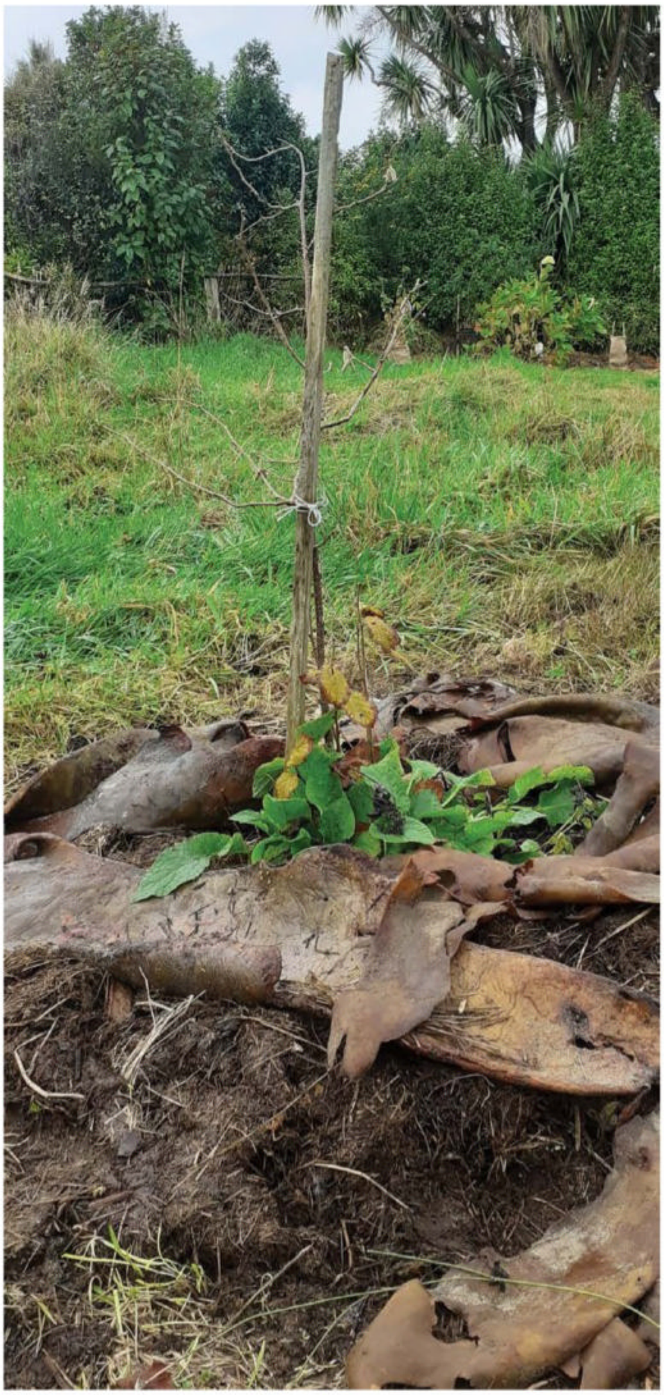
BELOW Lock in warmth with a DIY cloche of clear plastic. Spread it over hoops of polythene pipe pushed into the ground and hold the covering down at both ends with rocks or bricks.

Sow-me-now

In warm regions only:
Carrot, beetroot, broccoli, cauliflower, cabbage, kale.

In all but the coldest regions:
Flowers: alyssum, dianthus, lobelia, sweet William, sweet peas, marigolds, Canterbury bells, delphinium, gypsophilla, stock.
Herbs: chives, coriander, garlic, parsley, oregano, rocket.
Veges: Asian greens, broad beans, corn salad, Florence fennel, kohlrabi, mizuna, mibuna, onions, peas, pea sprouts, snow peas, spinach, winter lettuce.

In very cold regions, undercover:
Broad beans, pea sprouts.



ABOVE Heritage apples are less likely to be affected by disease. They also contain less sugars than commercial varieties, and so contribute to a healthier diet.

LEFT When planting food-bearing trees, mulch well to suppress weeds, and add kelp to break down over winter. Plant an understory of dwarf comfrey which can be cut twice-yearly to provide nutrients to the soil.

Pop in a perennial

With the exception of non-deciduous trees and bushes, now is the time to establish or enlarge your orchard, nuttery, and berry garden.

Always select varieties that suit your region and look for heritage trees (they are fuss-free and produce reliably). Ask for organically-grown, bare-rooted trees and bushes. These are young plants that are dug fresh from the ground, and as long as you get them into their planting hole as quickly as possible, they transplant more reliably than those grown in containers.

Always plant into well-drained soil, and mulch to keep down grass and weeds.

Fight for your fodder!

Fresh store-bought vegetables are becoming a luxury. If you want to reduce your food bill and keep healthy, growing through winter is essential. The most important aspect of late autumn and early winter gardening is to care for what you already have. This means weekly feeding of low-nitrogen liquid manure while there's still warmth in the soil to promote growth (high nitrogen feeds will only encourage tender new growth which is vulnerable to frost). Brew your own liquid manure by soaking compost, kelp, comfrey leaves, nettles, and just a scattering of aged animal manure, in a barrel of water. I let mine steep for a couple of weeks before straining it off and watering it around the base of leafy greens such as celery, silverbeet, spinach, rocket, winter lettuce, and brassica. I also check at night, with a torch, for pests that want my greens as much as I do. Slugs and sails are picked off and removed. Scrunched balls of paper popped in among foliage attracts earwigs which can be shaken out, in the morning, well away from the garden. Aphids get the squish!

Emergency gardening

Losing your garden to natural disaster is beyond disheartening, yet this is what has happened to so many growers in the wake of Cyclone Gabrielle and other recent weather events. Even worse, in many cases, the soil that remains is contaminated and unusable. In the short term, built-up beds, lined with black plastic and filled with fresh, uncontaminated, organic soil may help, but until that's possible, there are other ways to lift the spirits with home-grown produce. Sow a selection of fast-growing organic seed (such as kale, rocket, pea sprouts, and autumn mesclun mix) into clean, shallow containers of fresh, commercial, organic potting mix. Snip and enjoy the greens when 5 to 6cm high. Save some of the little plants from the scissors, and transplant them into clean, individual pots of uncontaminated soil to grow on in a sheltered spot or under a cloche. Sprout your own mung beans, lentils, and pea sprouts. Leave clean onions and garlic to sprout on a sunny window ledge, and snip the green tops into salads. If you live in a warmer region, consider container growing, in uncontaminated soil, shallow, fast-maturing root crops such as Parisian carrot and a range of stump-rooted radish. ONZ

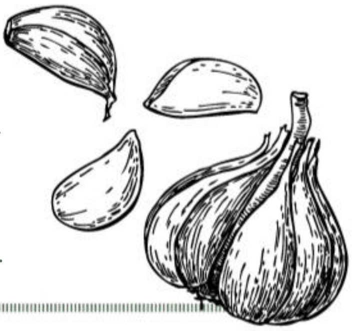
Diana Noonan lives in the Catlins where she grows 70% of her food through a variety of methods from permaculture food forest to French intensive.

ABOVE A shallow tray of fresh salad leaves lifts the spirits and provides an instant garden.
RIGHT Beat the rising cost of fresh, cold-season produce by sowing a fast-growing bed of microgreens. These tender edibles attract slugs and snails so check regularly at night with a torch, and remove them from the garden.

PHOTOS DIANA NOONAN. ISTOCK/RRAYA, EPINE_ART

Transplant-me-now

In all but the coldest regions:
Flowers: pansies, polyanthus, primulas, violas, ornamental kale.
Herbs: garlic, perennial rocket.
Veges: cabbage, cauliflowers, celery, broad beans, broccoli, Brussels sprouts, garlic, leeks, onions, spinach, winter lettuce.



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The moon's influence
explained

Gardening organically means working with nature to optimise healthy growth. Organic Edible Garden works with the moon phases as an intrinsic part of their growing philosophy.

The influence of the moon on seeds and plants is a big part of this and sets a rhythm for activities in our garden, and that means there's a time for everything.

At Organic Edible Garden working with the moon phases is an intrinsic part of our growing philosophy. To us, gardening organically means working with nature to optimise healthy growth. The influence of the moon on seeds and plants is a big part of this and sets a rhythm for activities in our garden, and that means there's a time for everything.

However, it's important not to be prescribed by it. Life gets in the way and the weather is often not conducive to gardening, so we use the moon phases as a guide. It's better to sow seeds when you can or when they are ready to be planted, than not sow them because you've missed the ideal time. The only exception is around the Full Moon – we've found that seeds sown on the last day of the First Quarter and two days into the Full Moon phase struggle and the seedlings lack vigour.

There are four phases of the moon, each lasting about seven days each.

- There's the **New Moon** (NM) which appears as a crescent. This is a waxing moon and during this phase there's a strong gravitational pull, drawing sap flow upwards, as well as moisture towards the surface of the earth and moonlight is increasing. This encourages above-ground growth of stems and leaves. It's the best time to sow and plant green leafy crops, and seeds germinate more easily due to more moisture.
- The **First Quarter** (FQ) is the next phase which is like the New Moon but fuller. This too is a waxing moon with stronger moonlight but slightly less gravitational pull. Continue sowing and planting leafy greens, and this is the best time to sow and plant crops with seeds inside (tomatoes, eggplants, peas, beans etc.)
- Next is the **Full Moon** (FM) when the moonlight starts decreasing and the sap in the plants starts to flow downwards. It's the best time to sow and plant root vegetables as this is a period of good root growth.
- Finally we have the **Last Quarter** (LQ) which is a waning moon and appears as a mirror image of the First Quarter. There is both decreased moonlight and decreased gravitational pull. In winter we advocate resting during this period (in summer we would say use the time for maintenance like weeding, mulching and making compost). Avoid seed sowing. It's a good time to prune and a good time to harvest as photosynthesis is slowest and less sap is moving through the plant which means a longer shelf life of the produce. ONZ

In May the phases are:

1-5 May	First Quarter
6-12 May	Full Moon
13-19 May	Last Quarter
20-27 May	New Moon
28-31 May	First Quarter

In June the phases are:

1-3 June	First Quarter
4-10 June	Full Moon
11-17 June	Last Quarter
18-25 June	New Moon
26-30 June	First Quarter

Activities for May include:

- Planting broad beans (FQ)
- Planting strawberries (FQ)
- Pruning fruit trees and vines (LQ)
- Feeding our citrus (LQ)
- Planting last of the brassicas in warmer climates only (NM)

Activities for June include:

- Making cloches to protect crops from heavy rain and frosts (LQ)
- Browsing seed catalogues for spring and summer planting! (LQ)
- Growing microgreens and sprouts indoors (NM)
- Planting out asparagus crowns or feeding up existing asparagus crops (NM)

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At Organic Edible Garden we produce an annual calendar with all the moon phases and recommended gardening activities according to the season. The 2023 calendar is half price at the moment and can be purchased at organicediblegarden.co.nz

Are you missing our regular Maramataka moon calender? If so, let me know. (And do you know of anyone with the knowledge and experience to compile one?)

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An Aunty to all

When disaster strikes, the basics of food and shelter become challenging. **Meghan Read** hears from Arohanui Lawrence about how her spray-free community garden demonstrates the strength of local food resilience.

Aunty's Garden is a source of vegetables, fruit, herbs, and community support which fortunately withstood the recent Cyclone Gabrielle.

Inception

Arohanui Lawrence (Ngāti Kahungunu), known as Hanui or Aunty, has been involved with the Waipatu Marae all her life. She began the community garden in 2003 on her cousin's land, adjacent to the marae. The 8000m2 property had been a paddock for grazing cows which Hanui originally ploughed and planted in rows.

Kahungunu Hikoi Whenua works to bring about social change to improve health and, in 2010, supported Hanui to develop the garden. She reworked the garden into winding beds that, when seen from above, represent flourishing koru. Limestone pathways separate the beds for visitors to walk through and take what they need.

The garden is supported through local funding and operates on a koha basis, with an honesty box in the garden. Hanui works in the garden most days and the fresh, spray-free produce is available to any who need it.

Gabrielle

Late February saw regular life at the Waipatu Marae upended by Cyclone Gabrielle. Thankfully, the marae and garden escaped the flooding that breached many East Coast areas. Neighbouring residents from Waiohiki, their own homes either flooded or threatened by the rising Tutaekuri River, were evacuated to Waipatu Marae by Civil Defence.

"That was the first time that we had a calamity like this, and the first time we were asked to take in evacuees," said Hanui. "We had over 100 evacuees staying with us in the marae. We had to use the club rooms and whare rūnanga (communal meeting house). But it was amazing, the people that came, and the products that came, too: water, produce, gumboots, wheelbarrows, towels, children's toys, and clothing."

"The rangatahi (young people of the marae) and a first responder's team took charge from day one," said Hanui. "They prepared bedding and necessities for the families, just pitching in and doing what needed to be done."

BELOW Hanui works in the garden most days. Her favourite crops are kūmara and taewa (Māori potatoes).
OPPOSITE Waipatu Marae became a hub of gathering and distributing, with constant community support.

Provisions

With the marae needing 80 to 100 extra meals each mealtime, Aunty's Garden became a source of kai for a larger community than usual. "We had a constant supply of greens from the garden; there was lettuce, kale, silverbeet. It was too early for the kūmara harvest, but we used what we could of our other produce."

After a week and a half, Waipatu started to receive contributions from other maraes and community centres, including people to help in the kitchen. Hanui was warmed by the generosity of people. "We became a hub of gathering and distributing. Trucks came from Tauranga and Palmerston North with huge containers; marquees went up. Chillers appeared, soon stocked with meats and disposables" said Hanui. "One day, we received six big apple bins, full of golden peaches. We thought 'Well, let's bottle them.' We bottled 100 jars of peaches for the community to use."

The overwhelming number of contributions went out into the community. "We were sorting a constant arrival of goods, passing goods hand to hand, and making up parcels. These parcels went out into the community. There was nothing spared to accommodate the evacuees, as well as others out in the community."

Aftermath

The ongoing difficulties in Hastings resulting from the cyclone are the influx of silts carried onto properties (rendering gardens and crops temporarily unusable with the impact on soil health a particular worry) and houses given yellow or red stickers (limited or no entry to residents) until formal assessments can be made. Twenty-five evacuees are still staying at the Waipatu Marae, mostly elderly and young families. Some of these elderly guests are afraid to return to their homes, which are waterlogged and vulnerable.

Hanui continues to look ahead to the future with hope. "We've all struggled," she reflected. "I'm a pensioner and we manage here. This has been a great opportunity to be humble, to be of service. It was a remarkable experience and a wakeup call, not only for us in the Bay but around New Zealand." ONZ

Meghan Read is the magazine assistant at *OrganicNZ*'s Wellington office and enjoys putting both words on a page and seeds in the garden.

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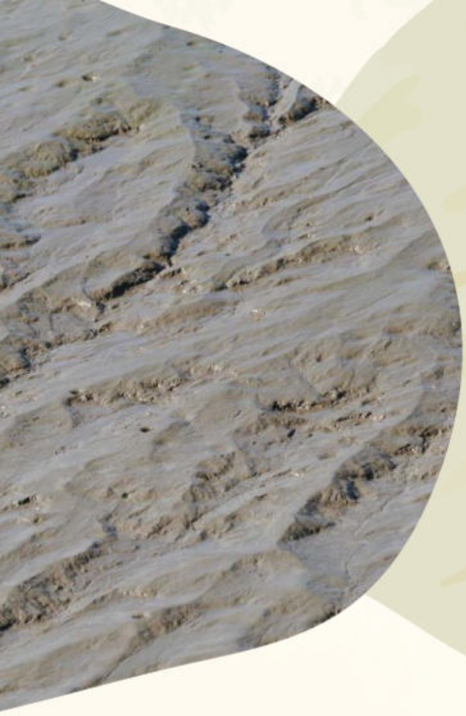

Silt to soil

REJUVENATING SILT ORGANICALLY

The silts from recent floods are devoid of the all important pore spaces, organic matter and microbes that make up a living soil. **Charles Merfeild** gives practical recommendations on how to use organic processes to re-establish these and revitalise mineral-rich silt.

What is silt?

Silt, sand, and clay are terms for specific sizes of the rock particles that make up soil – see figure 1.

Silt is left on flatter areas after flooding because the water currents are too slow to carry sand, and clay is so small and light it stays in suspension. Silt is also used as a general term for finer materials left behind by floods.

The east coast of the North Island has been particularly badly affected by flooding from Cyclone Gabrielle because many of its rocks are siltstones and mudstones. They are predominantly made of silt and clay particles, and are highly erodible, so large amounts were carried by the floodwaters.

Silts left behind by flooding (and also deposited by wind), is how many of Aotearoa New Zealand's extremely fertile soils began, then vegetation built up the organic matter, biology, and structure to form soil. While flood silt is not soil, it can be transformed into soil, often highly fertile soil. This can take a few, or tens of years, depending on approach.

Contamination

The first thing to determine is if flood silt is contaminated with harmful materials. Most biological materials such as sewage will naturally decompose over time so in the long-term they will not be damaging.

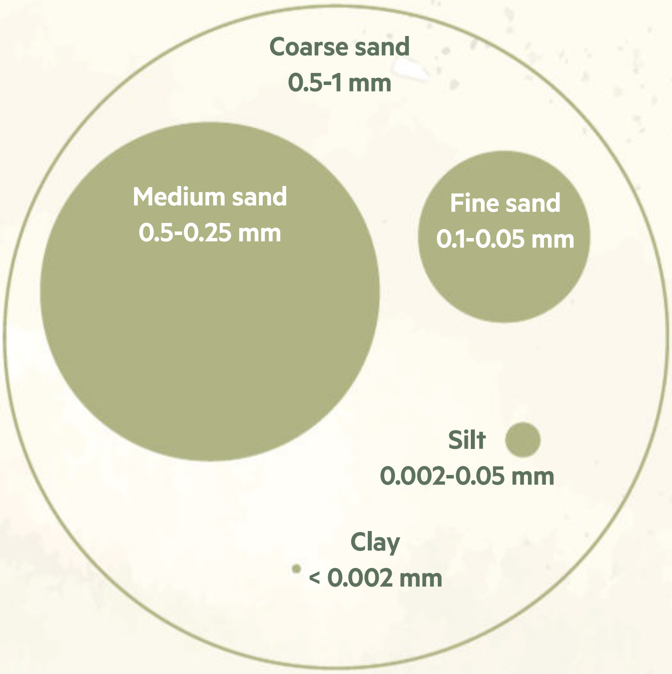

Figure 1. The relative sizes of sand, silt and clay particles.

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If it is suspected synthetic chemicals have been washed down, it is a much more complex problem and the effect will depend on the exact chemicals and their amounts. This issue is too technical to cover here, you need expert advice. Start by contacting your council and if you are organically certified, talk with your certifier.

Integration

How best to deal with the silt depends on how deep it is.

If it is less than 20 cm deep it can be dug in or cultivated into the soil below. This should bring the soil back to a form of normality quite quickly. Experience on pasture has shown that mixing the silt with original soil improved recovery, both short and longer term. Cultivation also destroys the interface between original soil and silt which can be a barrier to air, water and roots.

Between 20 cm and 60 cm deep it can be cultivated in, but, doing this manually in a garden will be very challenging, and even commercially, specialised equipment, e.g., a spading machine is likely to be required. Also, the amount of silt will be greater than the original topsoil meaning it will take longer to get back to full health.

Beyond 60 cm the silt will have to be removed if it is causing other problems, e.g., has buried infrastructure or is killing perennial plants or trees.

Incorporation

If the silt is not removed, then the best action is to get plants growing as quickly as possible to start the process of turning the silt into soil.

Some perennial plants, such as kiwifruit and citrus have low tolerance of waterlogging and anaerobic soils. For these species clearing the silt about 30 to 50 cm from around the trunks within 48 hours may be the difference between the plants living or dying. Sadly this will have been impossible or impractical in many situations.

Biological materials such as compost and manure and incorporated into the silt that can really kick start the soil-forming processes. Five per cent soil organic matter can equate to 500 to 1000 tonnes of organic matter per ha, so, in this situation putting on hundreds of tonnes of compost can be justified, if at all feasible. This will also boost the populations of soil microbes in the silt, to help its transformation into soil.

> *An ideal soil is 45 per cent mineral, 5 per cent organic matter and 50 per cent pore spaces occupied equally by air and water.*

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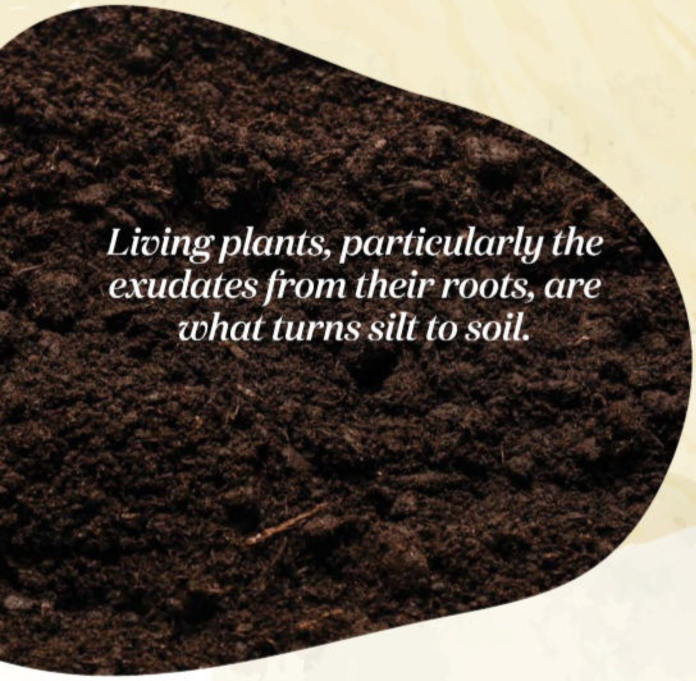
Regeneration

While silt will have very few soil microbes and other biology in it compared with healthy soil, it is far from sterile. Soil microbes are blowing around on the wind all the time. To get soil biology amongst the silt requires living plants.

Living plants, particularly the exudates from their roots (see the article 'Humus is dead - long live MAOM' in *OrganicNZ* Nov/Dec 22), are what turns silt to soil. Any plants are good and the more diversity of species the better. However, there are a number issues to take into account when deciding which species to use.

- The seed needs to be readily available and not expensive. This typically means pasture and arable species, i.e., cover crops.
- Species need to be suitable for your climate and also the time of year, i.e., don't plant frost sensitive species in autumn / winter in cooler areas.
- The plants need to grow quickly. To hold the silt together when it rains and stop it blowing around as dust in the dry. That also means pasture, and especially annual arable species / cover crops are best.
- You need all three of the herbaceous (i.e., pasture and arable) functional plant groups: grasses, legumes and forbs ('herbs').
- Grasses have fine fibrous root systems that are very good at holding onto the silt and keeping it in place. Annual arable species such as ryecorn, triticale, and maize have deep rooting systems which will hold onto more soil and grow into the original soil to tap into its nutrients.
- Legumes can fix nitrogen which will be in short supply. However, legumes need the right symbiotic bacteria to do the fixing, which may not be present in enough numbers in the silt. It is probable that white clover, being so ubiquitous across New Zealand, may be OK. Other species are likely to need inoculum applied with the seed. Inoculums are species specific. Talk with your seed supplier.
- Forbs are everything that is not a grass or a legume. Put in what ever you can, especially some deeper rooting species such as chicory (perennial) and sunflowers (annual) as these can 'punch' through the silt into the original soil and help transport soil microbes up into the silt. They will also help get oxygen down into the original soil as their roots die and create air channels.
- Annuals are generally much faster growing than perennials which is what is needed for quick establishment to protect the silt from wind and rain, but, they only grow for a few months. Try mixing some perennials' seed in with the annuals' seed so once the annuals are finished the perennials can come through. This is a form of undersowing described in the article 'The root of the matter: Intercropping and living mulches' in *OrganicNZ* Jan/Feb 23.



Living plants, particularly the exudates from their roots, are what turns silt to soil.

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- Avoid species that don't tolerate wet conditions, lucerne is the obvious example, as they won't like the anaerobic conditions in the silt. Ask your seed supplier.
- The exact species are not critical - the really critical thing is to get the silt sown with something rather than nothing, and sooner rather than later.
- Having a range of species can also help provide resilience because if some species don't do well, then others will grow to fill the gaps.
- Don't delay planting too long as the top of the silt will dry out. Drilling, if possible, would be preferable to broadcasting and rolling or raking the seed in.
- Silt that is smelly is likely to be anaerobic (or have toxins present) so cultivating it to introduce oxygen is likely to be required. Seeds sown into smelly silt may die due to toxins.
- If using machinery, the silt will need to be dried out enough to be tractable. It is likely the silt will be variable, from more clayey areas where the flood water was moving the slowest, to sandy areas where it was moving fast. Tractability will thus vary as the texture (makeup) of the silt varies, - be careful or you will bog the tractor!

Once you have some plants establishing, getting a full soil nutrient (macro and micro nutrients) and pH test will be valuable, and vital for commercial operations. This is because the silt is likely to have limited amounts of plant-available nutrients, as these are tied up with soil's organic matter - which is very limited in freshly deposited silt. Adding organic matter will supply nutrients, or use certified organic fertilisers.

Good luck and ngā manaakitanga. ONZ

Dr Charles Merfield is an agroecologist and head of the Future Farming Centre, which is part of the BHU Organics Trust. This article used information from a number of sources, particularly resources compiled by www.landwise.org.nz and www.hortnz.co.nz but have not been personally tested by Dr Merfield.

Do you have spare seeds? Help flood victims to regrow

Hawkes Bay Environment Centre is calling for donations of seeds to distribute to those affected by Cyclone Gabrielle.
Vegetables, flower, or pasture seeds - all would be appreciated.

Seeds will be available to anyone who wants them from the seed bank at the HBEC and will also be used in their current projects of establishing community gardens throughout the area.

The HBEC is a registered charitable trust working to create a resilient and regenerative Hawke's Bay.
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Foraging fungi 101

The fear of poisonous mushrooms keeps many of us from harvesting this nutritious, beneficial, organic, and free, food source. **David Whyte** provides a guide on foraging four common edible fungi with the vitally important tips for identification.

Fungi have come out from the gloom and starting to get the credit for the amazing life forms that they are. Part of this is an increased desire to forage and eat them. A noble goal.

But imagine you went to someone's garden in an environment you were unfamiliar with, and didn't recognize the plants. Every time you saw a new one, you asked: "Is this edible?" It would soon tire the host. Well, there are likely more fungi species in New Zealand than plant species. Just as edible plants are a minority, so are edible fungi.

The good news is that in urban or highly-modified environments there are likely more opportunities for foraging for the beginner than in indigenous forests.

Identification is very important, but one can start with the more unique fungi that are easily distinguishable and have few look-a-likes.

ABOVE David Whyte foraging and recording fungi under the oak trees at Eastwoodhill National Arboretum.

Fungi can be classified into different groups:

Edible fungi is self explanatory.

Inedible fungi, is not toxic, just unpleasant. Think of the crab apple, not toxic but inedible due to taste, textures, woodiness, etc.

Purging fungi, are those fungi that contain spores or other compounds that the body perceives as toxins. Thus the body will purge them. If one vomits or gets the runs after eating fungi, this is unlikely to be a fatal problem, as the body rids itself of the toxins.

Deadly fungi are the last group. These contain compounds that take out the liver or kidneys and the signs show up day(s) after eating – by which time the organs are failing. Which of course leads to serious consequences including death. Death caps, which are common in the warmer parts of New Zealand associating with oak trees, seem to drive most of these poisonings and fortunately only seem to occur every decade or so.

Wood ear / Hakeke / *Auricularia cornea*

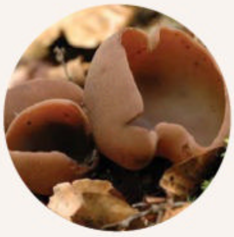
A native species that love to grow on dead, native, pioneer, tree species. Are often found in parks and areas that were planted in natives a decade or two ago and are now dying off – search out those unkempt areas that were once neat gardens. They grow directly on the logs, branches, and stumps. Wood ear often fruit periodically from autumn to spring and, depending on the size of the log, can come back over multiple years. They can also be purchased online as a spore kit.

I thinly slice and add to stir fries or Asian soups. They don't have a strong taste and are added more for texture and therapeutic properties. Can be dried and re-hydrated before use, but I much prefer the fresh versions and, due to how common they are, I no longer preserve them.

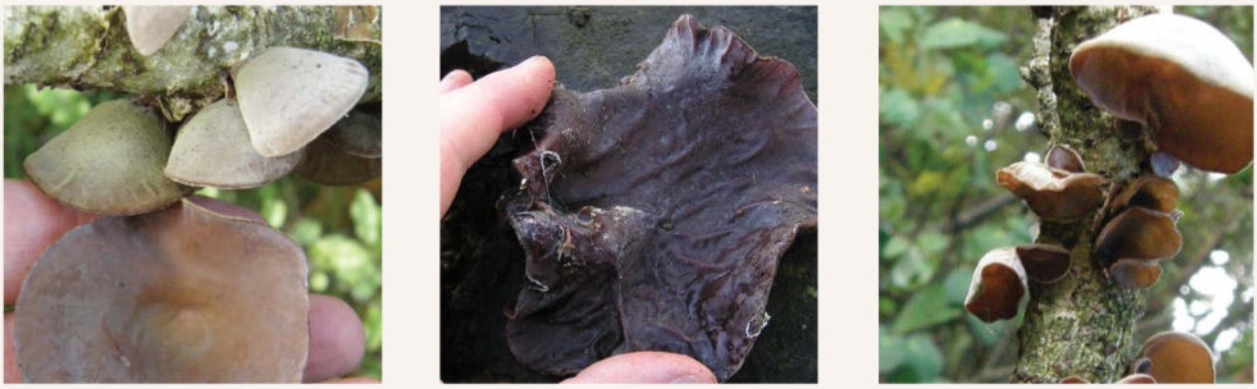
Look-a-likes

Peziza species can look similar but there are two key differences. Peziza grow on mulch or on the soil-wood mixtures and very rarely directly on logs, whereas wood ear grows exclusively on solid wood (branches, logs, stumps etc.).

The second difference is that when slicing them open, fresh wood ear has two clear sides with a gel substance in the middle, whereas peziza species are solid all the way through.



Peziza



Wood ear at different stages of maturity.

Wine cap / *Stropharia rugosoannulata*

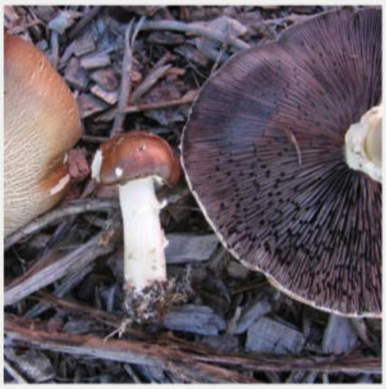
We have these growing wild all about our place. They love fresh mulch and as we spread fresh mulch, they magically appear. A wonderful surprise and something I would recommend for all folks who mulch. They can also be purchased as a spore kit from multiple suppliers.

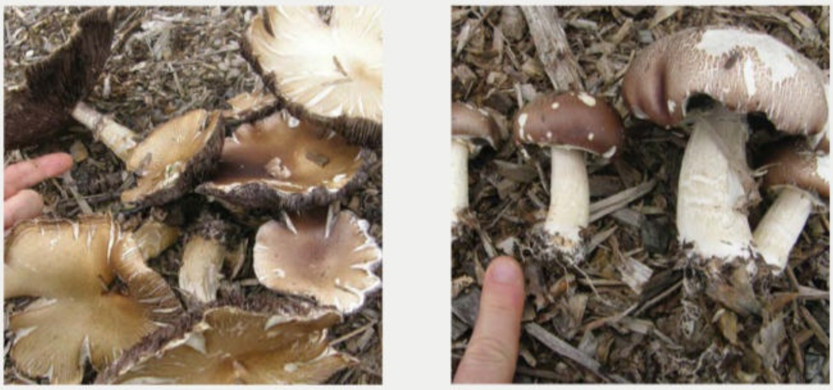
Wine caps also love to grow in fresh council mulch and often fruit whenever there are warm heavy rains. A patch will run out over time unless fresh mulch is added.

With a pretty wine-coloured cap, they are a robust, large fungi, with one or two fitting in a hand. They can grow to dinner-plate sized, although are best eaten when smaller and less mature. There is not a bulb at the base and when picked often mycelium will still be attached to the bottom. This can be trimmed off with the dirty part of the fruiting body and placed into a suitable fresh mulch pile as a way of spreading the love. They have a ring on the stem, although this is loose and can be lost.

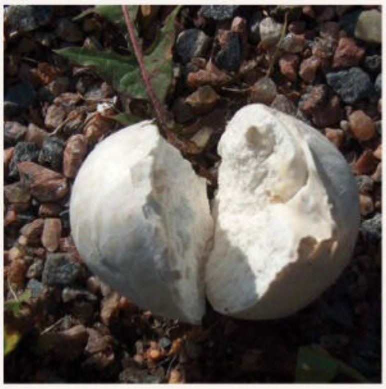
The spore color is a purple-black. This is different to the brown/dark-brown spores, and learning how to make a spore print is a great skill to have (and is easy to do). The gills will start a lighter colour before going purple-black too. Often the ring will also have a slight coating of these purple spores.

Eat them the same as you would shop-purchased button mushrooms is the best idea. Use in your classical mushroom recipes for a great dish.

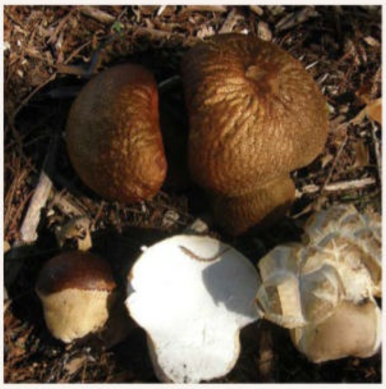




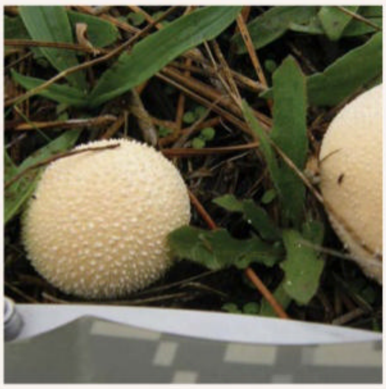
Wine caps at different stages.



Puffball Bovista



Puffball Calvatia



Puffball Lycoperdon

Puffballs Pukurau / Tuutae-atua

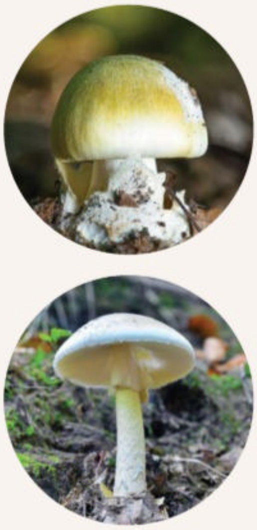
Puffballs are the common name for the genus of Bovista, Calvatia, Lycoperdon and some other minor genu. They get the common name as they are somewhat spherical and when they are mature, they have openings in the top of them which emit a puff of spores when touched. If the puffball is white on the inside it is edible. Once the spores start to mature and it goes yellow, then eventually brown, they become inedible.

They come in a range of sizes, from small, like a macadamia nut, through to massive ones that can be mistaken for sheep (yet to see a giant puff ball in person!). They all have some kind of harder outer coating / shell and a softish inside. They can be spherical or more like a microphone shape with a ball shape on top and a column attaching itself to the ground. They may have a smooth outside, or may have tiny 'crystals' that when touched easily rub off, these type can be especially beautiful when young.

These are my favourite fungi to eat. They have a texture of marshmallow, but of course savoury. They will take on any flavours in the dish and can be added to any dish like you would any vegetable. So fried, boiled, sautéed, added to a sauce or soup - the list goes on.

Look-a-likes

For the beginner there are similar mushrooms which have serious consequences. Amanita species, when very young, can look like puffballs. This includes the fly agaric (our quintessential red toadstool with white spots – which isn't deadly, just purgative if not prepared correctly) and the death cap which is so deadly just one mushroom is enough to kill an adult. Thus it is very important to cut each puff ball vertically. If it is solid inside with no gills, it's an edible puffball. If it has cavities and a cap like structure, beware!



ABOVE Death cap mushrooms when immature (top) can be mistaken for a puffball, but dissection exposes the gills and cap more apparent when mature.

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Birch Bolete / *Leccinum scabrum*

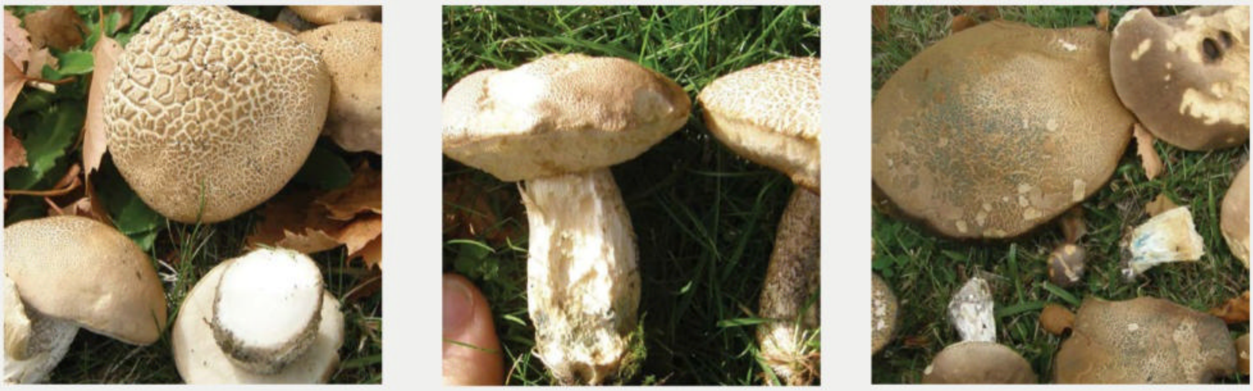
As the name suggests these associate with silver birch trees, in a symbiotic mycorrhizal relationship. They are found throughout NZ and considered a very worthwhile forage. Boletes are the group of fungi that are distinguishable as they have spongy material under the cap instead of gills. A birch bolete has a spotty stem and a chestnut brown cap, with typically a lighter-brown spore.

Check for a nearby birch tree if you find something that you think is a birch bolete. Roots don't respect property boundaries, and travel further from a tree trunk than the tree is tall. However, I typically find boletes within the drip line.

Look-a-likes

Boletes are mutualistic fungi. Different species associate with the roots of different tree species, giving and taking nutrients. The host tree is the easiest identifying factor. Pine and larch boletes (Suillus) are edible but have a slimy cap which is not pleasant and acts as a purgative.

Another distinguishing feature is colour. If they have red (toxic) or bruise blue they are not birch boletes though sometimes, confusingly, birch boletes may bruise a blue-green at the base of the stem. ONZ



Birch Bolete

A wise rule of fungi hunting is to get someone else who is knowledgeable on the subject to identify them. Fungi are hard to identify, and until you get knowledgeable on a specific species, ask someone who knows. Online facebook groups (New Zealand ones, since overseas fungi is different) are great e.g. Fungi Hunting New Zealand. Also iNaturalist can be useful for collating and storing your finds, and helpful with identifications (but doesn't do edibility).

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Creative *in the Cold*

Inclement weather does not stop growers in the deep South. **Diana Noonan** finds out how they have recycled their way into productivity.

Owaka (population: 300) is the Catlins' main service centre. See the small town on a warm day in summer, and you could be lulled into thinking it enjoys a mild climate. But the dense rain forest further south, the wild ocean just over the hill, and the wind-sheered macrocarpa in the surrounding paddocks speak a different story.

It's in this inhospitable terrain that mother and daughter duo, Wendy and Carla De Boer have established 'Basil and Baylys', an enviable, large-scale, organic garden. It serves their twin goals of living the good life and providing their community with fresh organic produce and healthy seedlings. How they come up with the goods, while battling the harshest of climates, is a mystery I wanted to uncover.

From balmy to bleak

Carla's background to growing has been a steamy affair. She completed a horticultural apprenticeship at the Dunedin Botanic Gardens, and while later working in its propagation unit, took on the role of caretaker of the indoor tropical forest at Tahūra (The Otago Museum). Hooked by horticulture in general, she eventually sold her house in the city, and moved with her family to land they already owned further south in the Catlins.

On a mission

Wendy has gardening 'in her genes', thanks to a florist-gardener grandmother and mother, and is well known as a passionate grower of heritage tomatoes. Like Carla, she wants to serve the local Ōwaka community in the way she knows best.

"We're a long way from a garden centre," she tells me, "and a long way from market gardens. People down here don't want to buy limp seedlings or days-old fruit and veggies that have been sprayed, and then freighted on a truck all the way from Christchurch. And they often can't afford to – we're not an affluent town, and we have a lot of pensioners living here.

"We're in a position to supply our community with fresh food and healthy seedlings at very modest prices because we do what we do as much for the lifestyle as for profit."

It works the other way, too, with community supporting Carla and Wendy's dreams, as Carla explains.

"We enjoy the barter economy we find here – swapping a pig for plants or cow poo. Or we'll have friends who phone and say: 'We've got miles of dags. Come and get 'em!'"

Rampant recyclers

Growing in a cold climate takes more than dreams, especially when you're determined to use recycled materials to make it happen. Basil and Baylys' work shed is stuffed with seed trays, punnets and pots sourced from nurseries that are happy to pass them on "at the end of their financial year!" smiles Carla. "We refuse to buy plastic so we also encourage customers to donate and return seedling containers once they've finished with them."

Old farm implements provide support for climbers in the garden, cut down tanks serve as raised beds, and the 'seed house', as Carla and Wendy call their propagation room, is a recycled work of art.

OPPOSITE The seed house is the centre of operations in a climate where even late spring can bring snow.
ABOVE Wendy's Malabar spinach seedlings form strong roots when grown on the sand bench. She's looking forward to moving them into the 'tropical centre' of the tunnelhouse.
BELOW Carla and Wendy built the seed house themselves, from recycled materials.

The seed house

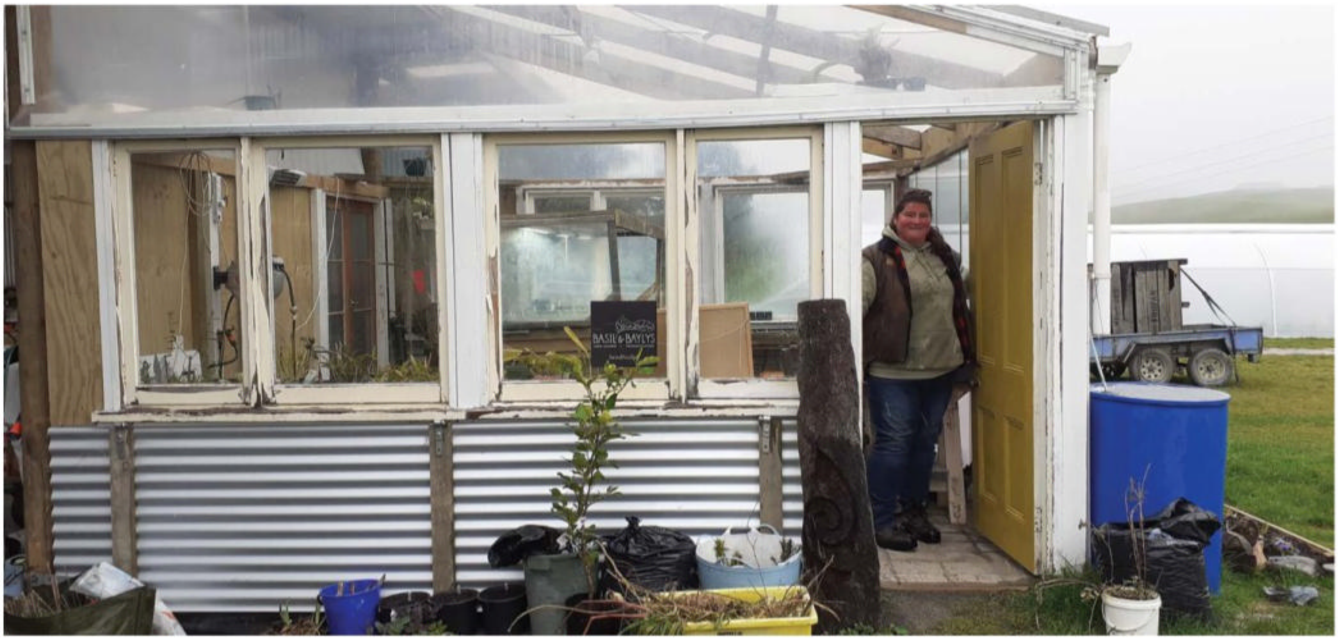
Built almost entirely of recycled windows, the floor of the seed house is a mix of demo bricks and repurposed pavers, while the timber, and the clips that hold the poly plastic sides and roof in place, are leftovers from other building projects. The only new material purchased for the job is the twin-wall polycarb used on the roof. But it's the DIY sand bench propagator that is the 'jewel in the crown' of the seed house.

The sand bench

At 3m long and 1.2m wide, the heated-sand propagating bench takes up most of the seed room.

"In commercial systems," explains Carla, "a heated sand table is used to propagate because it holds a really good, even temperature. In our climate, especially, I knew we needed one."

When Carla and Wendy found an old table that was being sold off by a nursery going out of business, they scooped it up and carted it home. On top of it, they placed a sheet of cement board, to protect the wood from moisture.



TOP The roots of these giant garlics show just how well they have penetrated the unloosened clay base of the no dig beds.

ABOVE This recycled water tank provides a deep bed for oca (New Zealand yam).

OPPOSITE Heritage tomatoes are grown in succession as there's no telling at what stage the heat will arrive, and for how long it will stay.

And on top of this, they built a 150mm deep pine wood frame which they lined with black plastic before loading it with a 2cm depth of sharp sand from the local Clutha River. Fifty metres of specially designed heating cable from Excel Industries in Christchurch was laid over the surface, and covered with 8cm more river sand. A probe and thermostat keep the sand at an even temperature, and overhead grow lights can be switched on in winter.

Seed containers sit on top of the sand which soaks up excess moisture when the plants are watered. The constant heat evaporates this moisture into the atmosphere, creating a comfortable humidity for the seedlings.

"In winter," explains Carla, "the room temperature can be relatively low, but the plants' roots are cosy. And that's what counts for germinating seeds, and growing seedlings."

"We raise a lot of basil on the sand bench," adds Wendy. "With our cold spring, we thought we'd have to cover them with polythene, especially when it was snowing outside. But the bench kept their roots warm, so the plants were fine."

Double trouble!

To further battle the elements, Carla and Wendy rely on a double skin 42m long Redpath polytunnel. Carla and her father, Alex, managed to erect its frame, but called in contractors to help haul on the skin. It was a tense time as the endless Catlins rain and gales held up the progress. But the results have been worth it.

"We have wind screaming at us from all directions," says Wendy. "But we've chosen a solid structure. Same with our Redpath shade house."

"We're also thinking of the future," says Carla. "Which is why we've planted shelter belts of trees, including acacias, eucalyptus, Douglas fir, hazels, and natives. They'll supply us firewood, timber, and nuts, as well."

Micro-climate magic

Outdoors, the battle with the wind continues, but Wendy and Carla have found the secret to providing shelter for their beds. They allow plants facing into the prevailing wind to run to seed. The dense, tall 'jungle' they create, shelters everything in their lee. And in keeping with the recycling model in the garden, sheltering plants that aren't required for seed production are harvested, bit by bit, and fed to the chooks that in turn provide manure for the beds.

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Loving the clay

Carla and Wendy's growing beds are strictly no dig (the ground beneath them remains unloosened). They have been formed by laying down cardboard on clay-based pasture land which for 14 years enjoyed the benefit of a chemical-free, humus-strengthening, regenerative farming approach. The cardboard was topped with a 10cm layer of compost. Plants grow through this, and their roots take firm hold in the moisture-retentive clay beneath. The system seems deceptively simple, but the results are outstanding.

Moving forward

Sustainability is key to Carla and Wendy's approach. But harvesting their own rainwater, recycling, and supplying locally, was never going to be enough for these two. Plans are underway for solar panels that will be 'tied to the grid' (there's either a feast or a famine of sun in the Catlins), and a planting of 3000 basket willows is just around the corner to help provide home made infrastructure and practical items for the garden and the community.

As for Carla's life in the tropics, it looks set to continue, even at latitude 46° south!

"It was 47.1°C degrees in the centre of the tunnel house the other day," chuckles Wendy, who is already raising Malabar spinach seedlings in anticipation of moving them in.

"I can see a tropical garden coming up," confirms Carla. "A place for my monsters and other aroids."

"And tropical fruit such as pomegranate, citrus, and passionfruit," adds Wendy.

This mother-daughter duo are unstoppable. Look out Ōwaka – locally grown bananas may be just around the corner! ONZ

Diana Noonan is a vegan, gardener and writer. She lives in the Catlins where she grows 70% of her own food on an average-sized domestic section using a range of techniques from food forest permaculture to French intensive. A home-grown wood lot supplies fuel for the family's cooking and heating.

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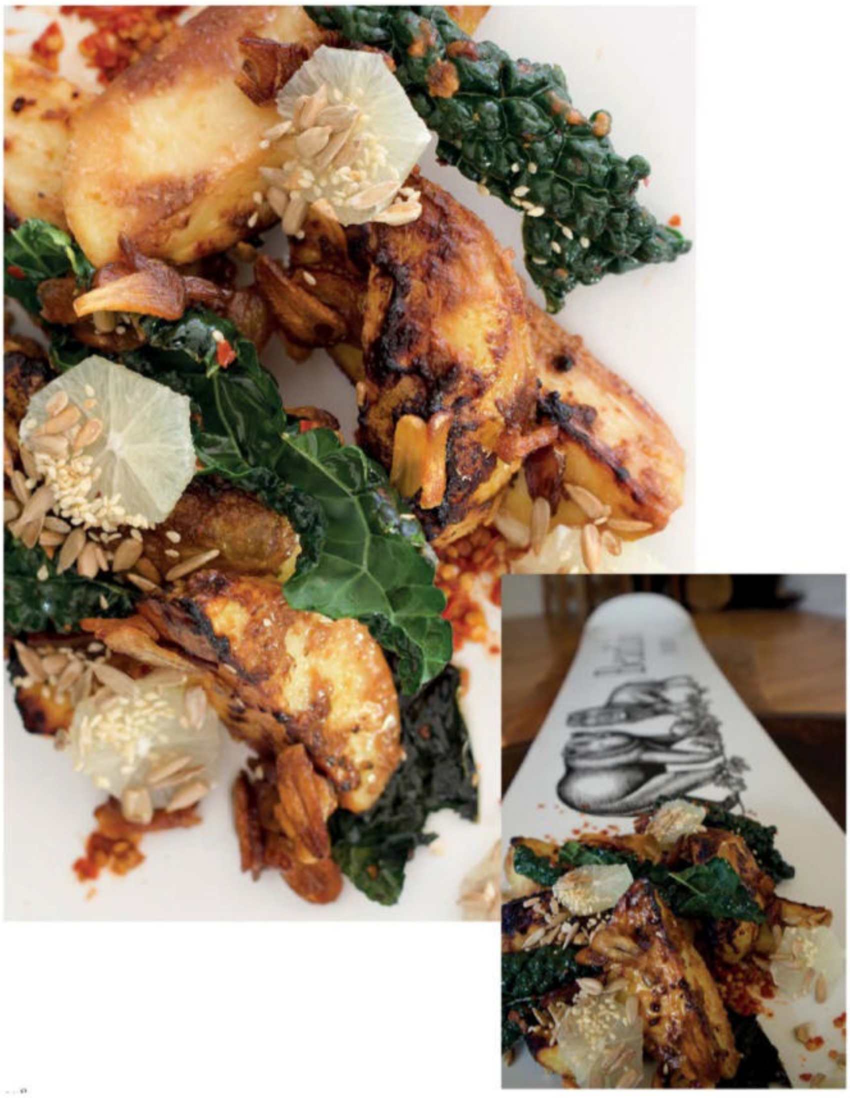
Food for Thought

A Real Food advocator, chef, environmental fairy, mover, shaker and motivator, **Alesha Bilbrough-Collins** puts it all in *Food for Thought*. Brutally honest (sometimes abruptly so) she gives lively comments about basic ingredients and her experience of glyphosate poisoning amongst a multitude of creative, efficient, and uniquely kiwi recipes for healthy food.



Miso potatoes, garlic, kale, sunflower seeds, lime, chilli

FEEDS 4

⅓ cup sunflower seeds
4 heaped tbsp miso paste
2 tbsp olive oil
3 tbsp water
6 potatoes, scrubbed, chopped into big wedges
8 cloves garlic
¼ cup olive oil
5 big kale leaves
1 whole chilli, finely chopped, or dried flakes
2–3 limes, zest and flesh
salt

The addition of fresh slices of lime to this salad is what really brings it alive. I go nuts for limes when they are in season. If you are making this when there are none available, lemon will suffice.

Preheat oven to 170˚C fan bake.

Toast the sunflower seeds on a small tray for 15 minutes.

Remove seeds from the oven and turn temperature up to 220˚C.

Mix the miso, olive oil and water in a bowl, add your potato wedges and mix and coat well. Spread them on a tray and roast for 20–30 minutes. Don't be alarmed as the miso can darken quickly. If your oven is super hot and it looks as though the miso is blackening, turn oven down to 200˚C. Finish cooking when spuds are tender.

Slice garlic thinly and place in a small pot with the olive oil, cook on medium heat until just starting to brown and then turn the heat off. The hot oil will continue to cook the garlic.

Prep your kale by washing and stripping the frills from the stems, then roughly tearing the leafy part into bite-sized pieces. Slice the stalk thinly. When potatoes are ready, turn off the oven, remove the tray and place your kale stems and leaves on top. Put back in the oven and let the residual heat almost blanch the kale. Give it 5 minutes and then remove to cool.

Put the potatoes and kale into a bowl, add all the garlic and oil, chilli (use as much or as little as you like; fermented chilli is my favourite) and lime zest. Remove the pith from the lime, then slice very thinly and add to the potato mix. Give a good toss and try a mouthful with a little bit of everything together. Does it need a little salt to bring it all together?

Serve as is or with a whole fried flounder, or perhaps some chopped boiled eggs with aioli.

Mustard cabbage, dried tomatoes, capers, spring onion

4–8 SERVES

- 1 small cabbage, chopped into big chunks
- 1 tbsp olive oil
- ⅓ cup mustard
- salt and pepper
- 1 cup dried tomatoes (see note in recipe)
- 2 cloves garlic, finely grated
- ⅓ cup capers
- 3 spring onions, sliced
- 2 lemons, zest and juice
- 3 tbsp extra virgin olive oil

Roasted cabbage is going to become your new best friend. It's so quick, easy and yes it's yummy. If it's one of those days and you can't be arsed with all the other ingredients, then no worries, just go cabbage all the way. But if you want a little more 'boom boom' then go the whole hog and make the effort.

Go crank your oven up as high as it goes, on fan bake.

Chuck ya chopped cabbage into a bowl, add the olive oil, mustard (I'm a Dijon or hot English lass) and a pinch of salt and pepper then toss the cabbage through it. Get your hands in there and make sure the cabbage has a nice even coating of mustard mix. (Don't waste the outer leaves unless they're in bad condition.) Spread this out evenly on one or two lined baking trays or roasting dishes, cook for 10–15 minutes. Don't put too much on one tray. You want the cabbage to get all crisp and coloured on the edges. It won't do this if there is too much steam created by overloading. It should start to brown up and get awesome little bubbles in some places.

While it's all a-go-go in the oven, you're now basically making a kind of salsa to dress the cabbage with. It should be sharp and salty in taste. The tomatoes add a bit of sweet and the cabbage will mellow it out. I always make my own dried toms when we have a glut, but just use what you can find. In oil is fine or if you're using the really dried ones you may have to rehydrate in water first. Chop tomatoes thinly and put with all the other ingredients in another bowl and mix.

Combine all the cabbage into one of the roasting dishes when it has cooled and then spoon over the tomato mix. Alternatively, toss everything together lightly with your fingers and pile up in a shallow bowl. If you're having this as a side and you don't eat it all, you'll have leftovers for next day's lunch.

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Upside-down apple and polenta cake

SERVES 8–12

- 2 red apples, sliced
- 3 green apples, diced
- 3 eggs
- 100g melted coconut oil or 100ml olive oil
- 70g sugar
- pinch salt
- 2 tsp vanilla extract
- 130g (130ml) yoghurt
- ¼ cup fine polenta
- 55g almond meal
- 90g spelt flour, sieved
- 2 tsp baking powder
- 2 tbsp each zest and lemon juice

I love good cake. If you have good cake, it's unreal how quickly it can disabear! I love the addition of the apples in this recipe and the ease of upside-down cakes is always a delight. If you don't have apples, any other fruit is welcome. Use coconut yoghurt if dairy-free baking is desired.

Preheat oven to 160˚C fan bake.

Place sliced apple in a layered pattern in the bottom of a greased or lined round 20-centimetre cake tin.

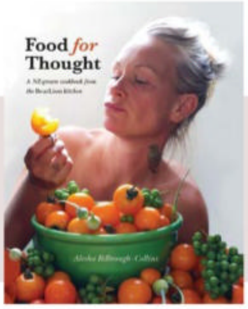
In a bowl or electric beater, whisk eggs, oil, sugar, salt, vanilla and yoghurt until light and fluffy.

Place all the dry ingredients in a separate bowl and stir until combined. Add the diced apple and wet mix, and continue to fold through until evenly mixed.

Pour the cake batter over the slices and bake for 30–40 minutes until a skewer comes out clean.

Leave for 10–15 minutes and then turn out to cool, baby. Served with lemon curd in the picture. Try garnishing with your own favourite selection of edible flowers.

This is an edited extract from *Food for Thought – A NZ-grown cookbook* from the BearLion kitchen. (Bateman Books, RRP$55.00)



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Happiness

BEGINS WITH GOOD FOOD

The hormones that support us to feel calm, content, and happy are produced in our gut from the food we eat. **Laura Hett** explains how our diet affects our state of mind.

With it being well-established that up to 80% of our serotonin, also known as our 'happy hormone' is produced in the gut, it's becoming clear that our gut health has a vital impact on our mental health via the gut-brain axis. And we're only just discovering the full extent of it.

Gut health refers to the gut microbiome which is a term for all the bacteria, fungi, and viruses that are (most of the time) happily residing in our gut. These microbes provide very important functions and benefits to our immune system and mental health.

The gut microbiome is in constant flux balancing 'good' microbes and 'bad' microbes. For example, after a round of antibiotics, it is not just the target bacteria getting killed, all the microbes in our gut get knocked out. The 'bad' microbes then tend to repopulate the quickest, tipping the balance in favour of the 'baddies'. If we follow up with some probiotics and sauerkraut, we tip the balance back towards the 'good guys' again.

Let's compare this to what happens in nature. If we cut a lot of native bush back, it's likely weeds and gorse will regrow. Native bush usually takes a lot longer and may require some help.

Sometimes it's not as simple as a seesaw between the goodies and the baddies. Factors (such as those top right) might mean we lose diversity. A loss of microbe diversity might not mean there's too many 'bad guys' but there is just not enough different types of species.

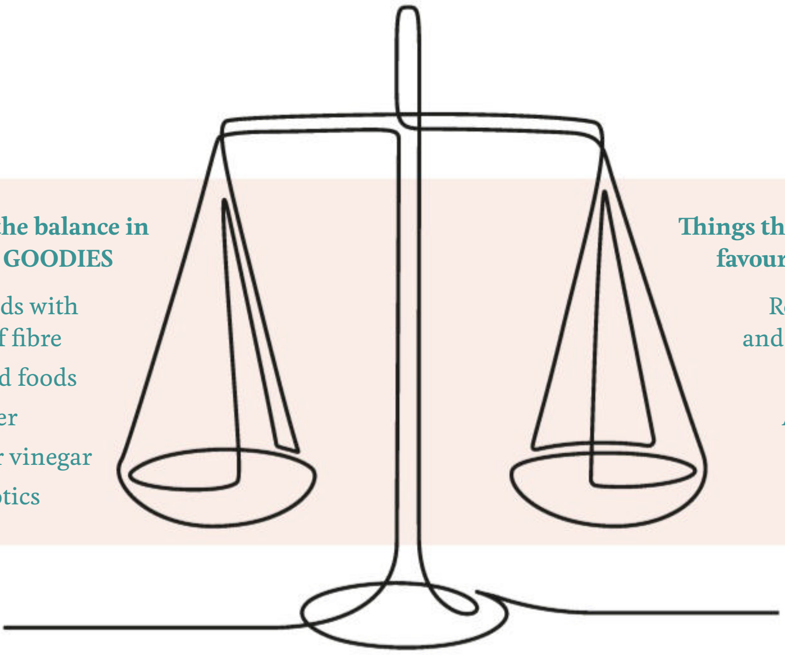
Bringing our analogy back here, this would be like comparing a lawn of grass to a patch of native bush. There's nothing inherently wrong with the grass lawn, but one species doesn't provide the habitat and food for birds and bugs like a patch of native bush does.

How the gut microbiome impacts the way we feel

If the gut microbiome is tipped too far in favour of the baddies, or we lose microbe diversity, then our ability to make and utilise serotonin is impacted. Serotonin is a vital neurotransmitter that helps us feel happy and calm.

This occurs because the metabolites of bacterial fermentation (what happens when bacteria break down food directly interact with nerve cells, and regulate the creation of serotonin. Good microbes make metabolites that are beneficial to the gut-brain axis so a low production of these has an impact on the way we feel.

If good bacteria deplete → less of the beneficial metabolites are created → happy hormone production is interupted.



Things that tip the balance in favour of the GOODIES

Wholefoods with plenty of fibre

Fermented foods

Water

Apple cider vinegar

Probiotics

Things that tip the balance in favour of the BADDIES

Refined sugar and carbohydrates

Alcohol

Antibiotics

Stress

As well as the impact on our serotonin, different bacterial metabolites can activate our 'fight or flight' stress response. This is because we have a bunch of nerves connecting directly to the gut, making up part of the gut-brain axis that connect directly to the gut that make up part of the gut-brain axis. Activation of 'fight or flight' stress response means it's harder to think straight, we're less relaxed, we're anxious and we're more reactive (sound familiar?). This stress response in the gut can also cause symptoms like bloating, gas, and diarrhoea which can, in turn, cause more anxiety - perpetuating the whole cycle.

Inflammation

The other way our gut microbiome impacts our mood is via inflammation. The word 'inflammation' is bandied about a lot, and for good reason, as it has a role in the development of many different chronic diseases. Inflammation is collateral damage from our immune system doing its job.

For those who have a balance of bugs that favours the 'bad' in the gut, the immune system is constantly trying to get on top of these bad guys. The collateral damage that occurs as a result of this immune system activity causes inflammation which impacts our mental health via the enteric nervous system or by direct impacts on our neurotrnsmitters such as seratonin.

Immunity

The gut microbiome is located in the gut lining—the barrier between our bodies and what we intake from the outside world. For this reason, we have a good proportion of our immune cells located in and around the gut. The gut microbiome interacts with and helps to modulate our immune system. Alongside our immune system, we have an extension of our brain located in the gut which makes up part of the gut-brain axis—a highway of communication between the gut and the brain.

It is gut microbiomes that determine your overall health and wellbeing.

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How to optimise your gut microbiome

to feel great, more relaxed, and happier!

1. **Eat plenty of fibre and prebiotics**

Prebiotics are foods that feed the beneficial bacteria. Any whole vegetable provides good fibres and prebiotics. Foods that are particularly good are jerusalem artichoke, garlic, onion, bananas and apples.

2. **Absolutely use antibiotics when they are required, but only when they are required**

Follow up any antibiotics with a high-quality, high-strength probiotic. Also consider taking probiotics in preparation for travel, or after a stomach bug or incidence of diarrhoea.

3. **Breath your biome**

This concept was created by Dr Zac Bush and it's about exposing yourself to as many different environments as possible. Get outside and breathe in your garden microbes, and get into native forest to breathe in complex, diverse microbial environments.

4. **Aim to include raw fermented foods everyday - and I mean every day!**

Sauerkraut, kimchi, apple cider vinegar, tempeh, kombucha (although quality is important here), kefir, sourdough, raw yoghurt. Even better - try out making your own at home.

5. **Manage stress levels**

Stress can tip the balance of good and bad baceria via its impact on the nervous system. Consider removing stressful (optional) commitments (or people) from your life and bring in some restorative practices to manage the stress that's not optional. ONZ

ILLUSTRATION ISTOCK/STOCKNICK, OLGA UBIRAILO, TATIANAZAETS

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GE whiz

Genetically engineered ingredients are sneakinginto our foods. Is GE the future it is promoted to be? Is it safe? Are there better options? We need to inform ourselves and apply critical thinking, writes **Philippa Jamieson.**

Twenty years ago 10,000 people marched down Auckland's Queen St, demanding the continuation of the moratorium on genetically engineered organisms in New Zealand. Even though the government lifted the moratorium in October 2003, no one has yet applied to commercially release any GE organisms into the environment. After tens of millions of taxpayer dollars, most of the field trials conducted here have yielded no benefits and have been discontinued.

Since then, a whole generation has grown up aware that Aotearoa New Zealand is 'GE-free', like it's nuclear-free, but we're getting bombarded with claims that genetic engineering is safe and now really precise, and has a whole lot of benefits. Vested interests are pouring money into trying to convince us that GE could mitigate climate change and improve the environment.

What are the potential risks and benefits – to humans, animals, ecosystems? Who stands to gain? Who's funding the research and development? What are the ethical issues involved? What other (GE-free) solutions exist that may be safer and better? How should we regulate GE technologies for the health and safety of people and the environment? Just because we *can* do something, doesn't mean we *should*.

Genes cannot be viewed in isolation, and they interact with the environment. We need a holistic organic approach, looking at the whole ecosystem, from the soil up.

What's in a name?

Biotechnology

Biotechnology, or biotech for short, is a broad term that describes the human use of microorganisms or biological substances such as enzymes, to perform particular industrial, medical or manufacturing processes. GE is an obvious form of biotech, but biotech also encompasses non-GE technologies.

Genetic engineering (GE)

GE techniques are done by humans in a lab, to add or remove genetic material from a genome (the genetic material of an organism – a plant, microbe, animal etc.). GE cannot happen in nature.

Types of GE include:

- Transgenic – genetic material from one species is spliced into the genome of another species, e.g. fish genes into a tomato.
- Cisgenic – genetic material from a species is spliced into the genome of the same species.
- Gene editing techniques (see below).

Genetic modification (GM, and GMOs)

The term genetically modified organisms (GMOs) is widely used to mean GE organisms. Genetic modification is mostly understood to mean the same as GE, but be aware that some people incorrectly conflate GM with a much wider range of techniques that modify genes in some way – such as the selective breeding of plants and animals. But saving the best seed from a plant is not GE, as it doesn't involve humans tweaking genes in a lab.

Selective breeding

Also called traditional or conventional breeding, this has been done for millennia and is not GE. It involves humans selecting (typically) plants or animals with specific traits – such as hardiness, vigour, pest and disease resistance, yield, nutrition, flavour, keeping quality – and breeding from them. Recent examples in New Zealand include AgResearch's lower methane-emitting sheep, and Zespri's red kiwifruit.

Gene editing

The newer GE techniques (mostly since 2012) involve cutting out or adding genes to a genome. These include CRISPR-Cas9, ZFNs, TALENs and more.

The biotech industry is lobbying hard globally to exempt these techniques from any regulation, claiming gene editing is much more precise than the older forms of GE. It's also faster, easier and cheaper.

However, although scientists may know the function of a specific gene, they cannot control how the genome repairs itself or predict what changes may result. So the consequences are unknown and it must be kept strictly regulated to avoid or minimise any risk.

Gene drives

This uses gene editing to spread harmful genes through the whole population of a species, to permanently change or even eradicate it (for example to make 'pest' insects sterile). This poses major risks to ecosystems as it can't be recalled. The genes may spread to native relatives, and could make keystone species extinct.

GE myths dispelled

Do we need GE to feed the world? No – we can feed 14 billion people now (the world population is 9 billion) – but it's not distributed equitably, and some crops are feeding livestock or used as biofuels. Political and economic solutions are needed, not GE.

Do GE crops have greater yields? No – conventionally bred plants outperform GE crops in terms of yield, pest and disease resistance, nutritional value and tolerance of weather extremes.

Do GE crops reduce pesticide use? No – GE crops have led to increased use of pesticides (that includes herbicides, insecticides etc.), resulting in insect resistance and superweeds.

Is GE just an extension of natural breeding? No – GE techniques are radically different, can't happen in nature, and can introduce unpredictable changes and risks, such as toxins and allergens, impacts on nutrition and on wildlife.

Is GE safe, and the science settled? No – many studies funded directly or indirectly by the biotech industry point to the safety of GE, while many independent studies raise safety concerns about GE.

We've been eating GE food for years – so surely it's safe? No – there have been no long-term independent studies on the safety of GE food on humans, and those conducted on animals have raised safety concerns.

Hasn't the horse bolted? No – while GE ingredients hide unlabelled in many processed foods, we can avoid it by eating organic and whole foods. And NZ still has no commercial GE organisms in the environment, which is also a market advantage for the growing non-GMO market.

Case study: GE 'golden rice'

- Genetically engineered to include beta carotene, which converts to vitamin A in the human body. Developers say it will improve eye health in poor countries where people are vitamin deficient.
- The health and environmental risks are unknown.
- Golden rice could cross-pollinate with existing varieties, reducing biodiversity.
- The beta carotene in the rice deteriorates in storage.
- People would need to eat a lot of rice for any benefit, with fats for proper absorption.
- The root cause of vitamin deficiency is poverty and inequitable food distribution – political and economic solutions are needed, not GE.

GE-free solutions: Any GE development money would be better spent ensuring people can grow or buy foods with naturally high levels of beta carotene, such as sweet potato, leafy greens, carrots, squash, red capsicums and mangoes.

Farmers, consumers and scientists across Asia are opposed to golden rice – find out more at stopgoldenricenetwork.org.

Case study: 'Precision' (GE) fermentation

This technology is touted as a solution to reducing greenhouse gas emissions from animal farming, by producing proteins using microbes in vats. It most often involves GE yeasts, bacteria etc.

The health effects are unknown; it uses electricity, steel and other resources; and the microbes need carbohydrates to eat – maize, sugarbeet, or something else – what are the impacts of this? Is this just more processed factory food relying on industrial monoculture cropping?

The main motivation of companies investing in this (like most GE technology) is financial profit via intellectual property (patents).

GE-free solutions: We can reduce greenhouse gas emissions and produce natural plant and animal proteins by using organic, regenerative farming and growing, agroecology and permaculture, moving towards more localised, biodiverse food production. This has multiple benefits for our health, the climate and environment.

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GE – are we already eating it?

The good news is that no GE crops or animals are commercially farmed in NZ. However, many of us probably eat small quantities of GE ingredients without realising – GE could be present in all sorts of (non-organic) processed foods, from bread and crackers to ice cream, sauces, confectionery and more.

Anything including ‘vegetable oil’, or high-fructose corn syrup, or lots of impenetrable ingredient names, may well contain GE. Also we import GE animal feeds.

The best way to avoid GE is to eat organic, eat locally grown foods, and whole or minimally processed foods. That’s got to be healthier for us!

Why can’t I see GE on the label?

The trans-Tasman food agency, Food Standards Australia New Zealand (FSANZ), has so far approved over 90 GE food lines for human consumption, despite consumer resistance, and a dearth of health and safety research.

These foods are derived mainly from corn, soy, canola and cotton, and some also from potato, sugarbeet, wheat, lucerne, rice and safflower (see foodstandards.gov.au/consumer/gmfood/applications/pages/default.aspx).

GE food ingredients must be labelled, but the exemptions mean almost none of them are. Restaurant and takeaway foods are exempt, as are GE foods ‘that do not contain any novel DNA or novel protein, and do not have an altered characteristic… These foods are typically highly refined foods, such as sugars and oils, where processing has removed the DNA and protein from the food, including novel DNA and novel protein.’

FSANZ says the composition and characteristics of such GE foods are the same as their natural equivalents. But even if it is, and there is no health risk, GE crops have lots of other problems – for farmers and rural communities, and for the health of ecosystems. ONZ

Find out more

- Visit organicnz.org.nz and search using ‘genetic’
- GE Free NZ: gefree.org.nz
- GM Watch (UK): www.gmwatch.org
- Physicians and Scientists for Global Responsibility: psgr.org.nz
- sustainabilitynz.org: www.sustainabilitynz.org/
- The international organic stance on GE: ifoam.bio/genetic-engineering-and-genetically-modified-organisms

Philippa Jamieson is a former editor of *OrganicNZ*, and chair of the OANZ GE policy group.

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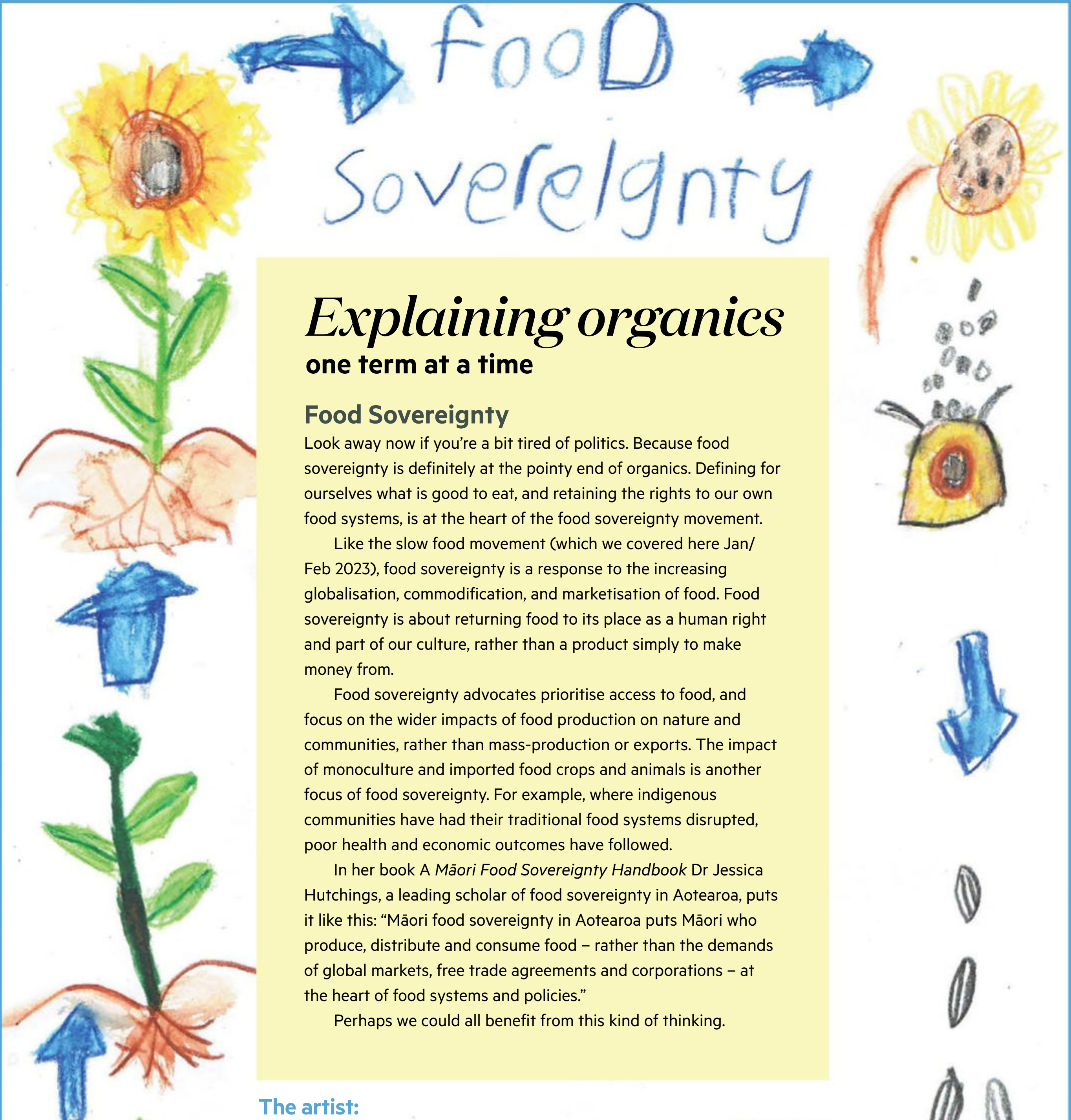


Explaining organics

one term at a time

Food Sovereignty

Look away now if you're a bit tired of politics. Because food sovereignty is definitely at the pointy end of organics. Defining for ourselves what is good to eat, and retaining the rights to our own food systems, is at the heart of the food sovereignty movement.

Like the slow food movement (which we covered here Jan/Feb 2023), food sovereignty is a response to the increasing globalisation, commodification, and marketisation of food. Food sovereignty is about returning food to its place as a human right and part of our culture, rather than a product simply to make money from.

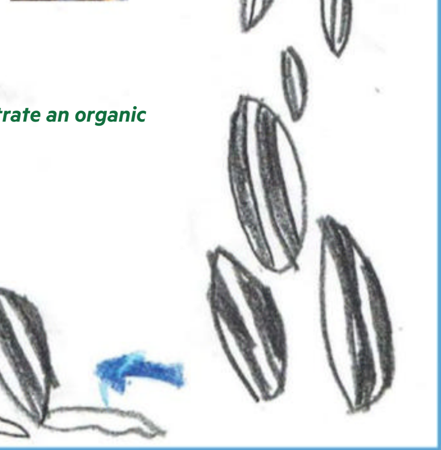
Food sovereignty advocates prioritise access to food, and focus on the wider impacts of food production on nature and communities, rather than mass-production or exports. The impact of monoculture and imported food crops and animals is another focus of food sovereignty. For example, where indigenous communities have had their traditional food systems disrupted, poor health and economic outcomes have followed.

In her book A *Māori Food Sovereignty Handbook* Dr Jessica Hutchings, a leading scholar of food sovereignty in Aotearoa, puts it like this: "Māori food sovereignty in Aotearoa puts Māori who produce, distribute and consume food – rather than the demands of global markets, free trade agreements and corporations – at the heart of food systems and policies."

Perhaps we could all benefit from this kind of thinking.

The artist:

Our illustrator for food sovereignty is six-year-old Greta Daniel who lives in Thames with nine chickens, her puppy Juno, her sister Lorna, brother Quinn and mum and dad. "I like climbing trees and I'm wondering how the first tree was planted. I have collected seeds of the Kowhai tree and grown them with Mum. I also like growing beans. I like to collect mizuna, kale, fennel and fennel flowers from the garden to make salads."



Are you, or do you know, a young artist who would like to illustrate an organic term for us? Email us at editor@organicnz.org.nz

Funding the FUTURE

Practitioners are convinced biodynamics is the way of the future – and are financing the research to prove it.

The practice of biodynamics runs deep in Aotearoa. Almost 100 years ago, the ideas expressed by Rudolf Steiner were adopted by a farm in Hawke's Bay. A small but passionate community has existed ever since, spreading and taking root in diverse landholdings, from small backyards to iconic pastoral farms and vineyards. Part of a worldwide movement, people gleaned suggestions and possibilities from Steiner's seven enigmatic lectures about 'biological-dynamics' and tested and refined them into modern biodynamic practice.

The Kete Ora Trust helps continue this learning and enquiry in modern times. It funds educational workshops and contributes to publications and conferences. Its current trustees are deeply experienced in their fields, with decades of experience in biodynamics. Kete Ora has been reinvigorated in the past 18 months, with new trustees and a new focus on funding research that produces scientific data that demonstrates the value of biodynamics practice.

Trust chair Sam Weaver is a well-known viticulturist and owner of Churton Wines. He says Kete Ora wants to raise its profile with potential donors as well as people needing funds for projects that will benefit the practice of biodynamics in New Zealand.

What makes biodynamics special?

The late Peter Proctor made a huge contribution to biodynamic understanding, not just in New Zealand but on an international scale. He was fond of saying that 'biodynamics is what makes organics work.' It is certainly the case that biodynamics rests on a shared foundation of accepted organic practice: protecting and enhancing soils and ecosystems and staying away from synthetic fertilisers, herbicides, pesticides, and fungicides.

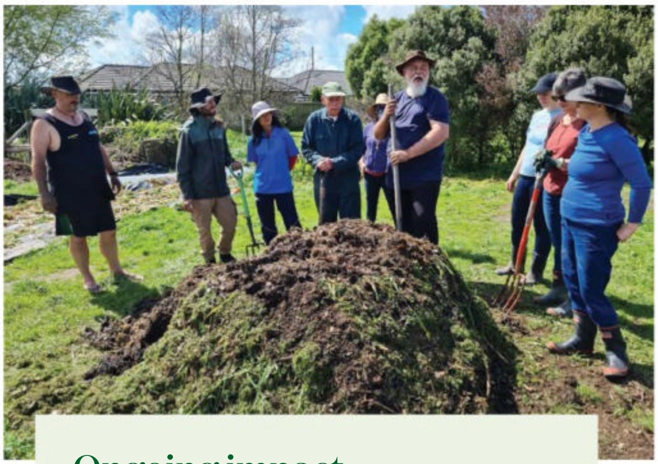
ABOVE Sam Weaver - overseen by Gordon.

If people know only a little bit about biodynamics, odds are they'll associate it with planting by the moon or using homemade sprays of esoteric ingredients. These are essential tools in the biodynamic kit but they are only part of a comprehensive holistic philosophy of agriculture.

Sam Weaver says the fundamental thing that defines biodynamics is a systems approach that views every farm or garden as a living whole. "We recognise the individuality of every landholding. Every decision, every activity affects everything else. The careful observations of people deeply connected to that place play a vital role. We emphasise analysis, testing, observing, refining your practices," he says. Specific practices are used to build soil fertility but always in the context of the needs of a particular property. You have to be a good farmer first, Peter Proctor would say, then add biodynamics on the top.

Some biodynamic properties choose to undertake the rigorous Demeter certification on top of meeting one of the organic standards. The number of Demeter licences has waxed and waned over the decades in New Zealand. Milmore Downs, a mixed farm in North Canterbury (profiled in *OrganicNZ* Jul/Aug 2017), is the oldest continuously licensed Demeter property in New Zealand. It's also certified organic by BioGro.

ABOVE In 2022, Kete Ora Trust funded Rototuna Farm Trust to host Peter Bacchus (left) and Coral Remiro (bottom left) to run three workshops on biodynmics and vegetable growing.



Ongoing impact

Kete Ora was founded in the late 1990s thanks to generous bequests from leading figures in Aotearoa's biodynamic community. The Trust has managed those gifts very well in the decades since and is now responding to the emerging challenges we face. Sam Weaver sees the Trust's role as ensuring the health and long-term viability of biodynamics. "Biodynamics is the most rational and effective form of carrying out agriculture, we're convinced of it. We really want to see the light shone on biodynamics and have it recognised as at the apex of the battle against climate change."

Biodynamic winemaking

Winegrowers currently make up over half of Demeter licensees. Sam Weaver says there are reasons unique to viticulture that explain the attraction of biodynamics. "Top winemakers strive to express the character of an individual vineyard. This concept of terroir is fundamental. Biodynamics is the only farming philosophy that emphasises the individuality of a site; it makes absolute sense to growers and makers of wine."

Statistics

BioGro's Organic Wine Report 2021 showed 2,418 hectares of certified organic vineyards (including 432 ha in conversion). The majority (70%) of biodynamic vineyards and producers are clustered in two regions: Marlborough and Central Otago. There were 102 organic labels and pinot noir is by far the largest variety produced.

The qualities of the grapes are integral to the wine they yield. Beyond the characteristics of a particular site—bony soils and hot summers, for example—a thriving soil microbiology will change the way the vines take up water and nutrients. That in turn influences the quality of the fruit and the wine that can be made from them, explains Sam.

Some people come to biodynamics because of an affinity for Steiner's broader teachings, a philosophy called anthroposophy. Others have been drawn by witnessing the results of biodynamic practice. "Winemakers in New Zealand are a close-knit community," says Sam Weaver. "When iconic winemakers produce the very best wines in their regions and they are using biodynamic methods—their peers pay attention to that."

It's not surprising then that one of Kete Ora's first scientific collaborations is with microbial ecologists from Auckland University to identify the microbial genome in soils in sauvignon blanc vineyards in Marlborough. Kete Ora is keen to expand the research remit to compare soil biology and carbon sequestration in soils managed biodynamically compared to soils managed according to industrial practices.

This has parallels in the Swiss DOK trial (biodynamic (D), organic (O) and conventional (K for the German spelling 'konventionell'), which has been running since 1978. Details of the trial can be found at glten.org/experiments/161. There are many scientific papers available online that analyse the data collected from this site, including investigations of the difference in soil organic carbon levels.

Kete Ora's trustees are keen to show people the science behind biodynamic practices, says Sam Weaver. "When you're involved, you can see the qualitative benefits for yourself. But we also want to support people to get the data to prove those benefits, prove those benefits, to quantify them, and to explain how biodynamic practices work from the viewpoint of modern scientific principles."

Kete Ora Trust accepts applications for funding throughout the year. Criteria and how to apply can be found on the new Kete Ora website, www.keteora.nz, along with details of projects funded previously.

Kete Ora Trust

Carbon

The difference between organic and industrial

Sequestering carbon into the soil is the key to sustainable growing. It is what organic farmers do. **Charles Hyland** investigates the difference between organic and non-organic farming practices and says it's time organics are recognised for their benefits to climate change, soil health, and air and water quality.

We talk about the carbon in the atmosphere and the carbon in our trees, but our soil contains twice as much carbon as these put together. The carbon in the Earth's soil is estimated to be 2.5 trillion tonnes, while that in all the vegetation in the world and in the entire atmosphere is 620 and 880 billion tonnes respectively. (Other carbon reservoirs are sedimentary rocks and the ocean.)

But the earth's soils are eroding away at a rate of 43 trillion tonnes per year, limiting farm productivity, polluting waterways, and reducing air quality.

It is estimated that around one third of all the world's soil has already been lost. According to the Food and Agriculture Organization of the United Nations, unless global carbon emissions and soil degradation are reversed, the outlook for the future of agriculture is expected to be increasingly bleak.

Thankfully organic farms around the world have been developing new techniques and refining traditional methods to sequester carbon into the soil.

Researchers in Europe found that organic farming methods decreased soil erosion by 22 per cent and increased water infiltration by 137 per cent.

Adding carbon to soil mitigates climate change, maintains the productivity of farms by supporting soil health, and keeps the air and water cleaner. It's a win-win-win.

Soils on organic farms typically contain more carbon and are measurably healthier. New Zealand's organic farms are a largely untapped resource when it comes to climate change and the environment. The stewardship practices used by organic farmers across the country should be systematically evaluated to determine what may be achievable if these practices were adopted by other sectors.

Organic and industrial farm management differ in a number of ways. One practice that impacts the global carbon cycle substantially is the use of synthetic nitrogen fertiliser. Synthetic nitrogen inputs are prohibited in an organic system.

Synthetising nitrogen

Just over a century ago, the world was changed forever by the development of methods for creating nitrogen fertiliser out of thin air and natural gas. The Haber-Bosch process synthesises ammonia (NH_3) by combining hydrogen from the methane (CH_4) in natural gas with nitrogen from the air to produce ammonia ($N_2 + H_2 \rightarrow NH_3$). The ammonia is then combined with carbon dioxide (CO_2) to create urea ($NH_3 + CO_2 \rightarrow CO(NH_2)_2$.

Lots of CO_2 is produced as a byproduct during the Haber-Bosch process, polluting the atmosphere and adding bubbles to the world's fizzy drinks. The Haber-Bosch process produces more CO_2 than any other chemical-making reaction in the world, accounting for 1.4% of total global CO_2 emissions. The CH_4 used in the Haber-Bosch process accounts for 1% of global energy production.

> *1.4% of global CO_2 emissions are from the manufacture of urea fertiliser – an input banned from organic systems.*

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Synthetic nitrogen fertilisers can also cause more nitrous oxide (N_2O), a greenhouse gas (GHG) 300 times more potent than CO_2, to be emitted from soil. Although N_2O emissions occur on nearly all farms to some degree, organic farms in Europe were found to emit 40% less N_2O than comparable industrial farms. It is estimated that synthetic nitrogen fertiliser production and use is responsible for about 20% of total global agricultural GHG emissions. New Zealand's only synthetic nitrogen production plant was built in 1982. Between 1991 and 2019, the amount of nitrogen applied to New Zealand soil increased by 629%.

The GHG emissions associated with the production and use of this massive amount of synthetic nitrogen fertiliser are irrelevant to the carbon footprints of New Zealand's organic farms.

Organic vs industrial

Considering that synthetic nitrogen fertiliser is not used on organic farms, it is reasonable to expect the carbon emissions and soil health status associated with organic and industrial farms to be different. Add to the mix the fact that synthetic nitrogen fertiliser can accelerate the loss of soil carbon on industrial farms that do not apply compost and the carbon footprints of organic and industrial farms are likely to diverge even more.

The productivity of organic farms depends largely on the degree to which their nitrogen and carbon cycles resemble highly efficient closed loops, in which waste is minimised and recycling is facilitated. The carbon and nitrogen cycles on organic farms are maintained using soil conservation methods that were developed to support intensive agricultural production while minimising environmental degradation.

When soil microbes consume nitrogen, they also consume a proportional amount of carbon. This is a big part of why the ratio of carbon to nitrogen is so important in composting. When the carbon to nitrogen ratio in a compost system is just right, microbes consume organic waste and excrete compost at a sustainable pace, generating heat in the process.

If you were to add a material high in carbon and low in nitrogen, such as wood chips, to this compost, the microbes would slow down and the compost temperature would drop because there would not be enough nitrogen available to pair with the newly-introduced carbon. Adding synthetic nitrogen fertiliser to soil is sort of like the inverse of this, causing soil microbes to consume more soil carbon than they would have otherwise and emit more GHGs in the process.

Emissions from organic livestock are often lower than their industrially-farmed counterparts due to the lack of synthetic nitrogen use, stocking rates being aligned with natural carrying capacity, manure and effluent management strategies and other common organic practices. Techniques commonly used by organic farmers, including manure composting, have been shown in Europe to reduce emissions of N_2O by 50% and CH_4 by 70%.

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Soil carbon sampling methods and systems are embedded in legislation in Australia but are unlikely to be measured in New Zealand without governmental support or incentive.

Time to be counted.

It is time to facilitate a more open and meaningful exchange of expertise between the organic and industrial farming sectors in New Zealand.

We need to quantify the GHG emissions associated with individual organic practices and their industrial counterparts. Although developing new solutions to environmental problems is essential, it is also imperative to make efficient use of the organic farming practices that have been refined and widely used in New Zealand.

Comparing the carbon footprints, detailed soil health characteristics, and rates of soil erosion of New Zealand's organic and industrial farms would be enlightening and empowering for everyone involved. ONZ

Charles Hyland is a soil scientist and biogeochemist and Soil & Health National Council Member.

Call for organic support

At our AGM last year, members passed a remit that we should write to Ministers and MPs on the topic of climate change and organic farming. We think the government should support farmers to improve their environmental performance and benefit from the commercial value brought through organic certification.

Read the full letter at www.soilandhealth.org.nz.

"Organic regenerative farmers around New Zealand are leading the way. They are doing this by lowering their environmental footprint, whilst also commanding a price premium. We believe that greater political support for the transition to organic food and farming, while embracing regenerative practices, can deliver the best of both worlds.

Trading partners such as the European Union and United States are already moving in this direction. They have clear targets and incentives from the government. It is time to create a more open and meaningful exchange of knowledge between the organic and conventional sectors for the benefit of the environment and society. This work requires leadership and resourcing from all sides, including politicians and the government.

To advance this vital opportunity we are calling on politicians and the government to fund targeted research on organic farm management, give incentives and support for regenerative farmers to certify organic, and to fund extension and support for farmers wishing to convert to organics.

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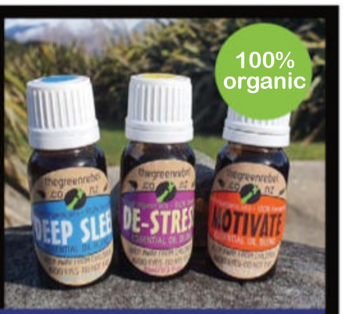

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Green

Updates

UK supports organic

The United Kingdom supports farming that benefits the environment via Countryside Stewardship.

Payments for organic farming rose by between 46 and 500 percent for those in the scheme and has been boosted by an agreement that will run for a further five years.

Support is available for nature-friendly practices that are in harmony with organic principles, such as avoiding insecticides and protecting soils, but the increase for fully organic is significantly above the average increase of 10 percent.

It follows the 11th year of consecutive growth for the UK organic market, which topped £3.1billion in 2022.

Lab-meat outlawed?

The Italian government has given its support to a bill that would prohibit the sale of lab-grown meat and other synthetic foods and recently banned the use of insect-derived flour in pizza and pasta.

"Laboratory products do not guarantee quality, well-being and the protection of the Italian food and wine culture and tradition," said Minister of Agriculture Francesco Lollobrigida.

Ozone threat

The ozone layer, which protects Earth from harmful ultraviolet (UV) rays, was severely damaged in the 1980s and 1990s by chlorofluorocarbons (CFCs) from aerosols and refrigeration. Thanks to coordinated global action the ozone layer was healing but it is now being threatened by space exploration.

Rocket launches, which have increased from 90 to 190 in the past five years, emit both gases and particulates that damage the ozone layer, with new fuels like methane yet to be measured.

The current impact is estimated to be small but has the potential to grow and currently New Zealand is a major player in the launch industry.

"Creating sustainable global rocket launches is going to take coordination across aerospace companies, scientists, and governments: it is achievable, but we need to start now," says Rutherford Discovery Fellow and planetary scientist University of Canterbury senior lecturer, Dr Bannister. "This is our chance to get ahead of the game."

Protected seas

It has taken almost 20 years, but United Nations member states have agreed on a legal framework for protected areas in international waters.

This establishes vast marine protected areas to protect against the loss of wildlife, and mechanisms to share genetic resources from the high seas. It will establish a conference of the parties (COP) that will meet periodically and enable member states to be held to account on issues such as governance and biodiversity.

But as Dr Becs Jarvis, Senior Lecturer, Department of Environmental Science, Auckland University of Technology, comments, the work is far from over.

" It will be important to keep an eye on how the agreement and associated pathways of implementation develop. Who gets to decide what conservation and sustainable use look like? Who gets to implement what where? Who stands to benefit the most, and who risks bearing any potential costs? Who will monitor and evaluate what is effective, acceptable, and equitable?

No improvement to water

In 2018, Environment Minister David Parker promised a noticeable improvement in water quality within five years.

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snippets

from the organic world

Our *freshwater 2023* (a report produced by the Ministry for the Environment and Stats NZ), reveals while 36 percent of lake sites improved, 45 percent have worsened.

Criticised as outdated and muddled, the report nevertheless shows that our water systems are seriously degraded with 45 percent unsuitable for swimming due to *E.coli* levels alone.

Other contaminants like heavy metals and chemicals come from wastewater from treatment plants and industry, stormwater runoff, and plastics and waste. Add to that introduced freshwater animals and plants and the effects of dams and irrigations, and our most precious resource is seriously damaged.

And it is not just the rivers and lakes. Sixty-eight percent of 364 groundwater monitoring sites failed to meet the Ministry of Health drinking water standard on at least one occasion between 2014 and 2018.

Cosmetic safety

The Environmental Protection Authority is calling for feedback on proposed updates to the Cosmetic Products Group Standard, which details rules for cosmetics in New Zealand.

In addition to relatively minor changes such as clarification of the hazardous nature of cosmetics, the major proposed change involves the phasing out of PFAS (perfluoroalkyl and polyfluoroalkyl substances) as components in cosmetics by the end of 2025.

PFAS (commonly known as 'forever chemicals') are defined as compounds containing both carbon and fluorine. Since the accidental discovery of Teflon in 1938, PFAS have been used to impart desirable properties such as flow, shine, water resistance, and durability to a number of industrial compounds, including those classified as cosmetics.

Evidence is building of the associations between PFAS and adverse human reproduction including miscarriage, preeclampsia, and impaired foetal growth.

> *"We cannot do everything at once, but we can do something at once."*
> CALVIN COOLIDGE

Pet power

Children exposed to indoor cats and dogs during foetal development and early infancy have fewer food allergies, according to a massive study of more than 66,000 children up to the age of three in Japan.

Nemophilist - are you one?

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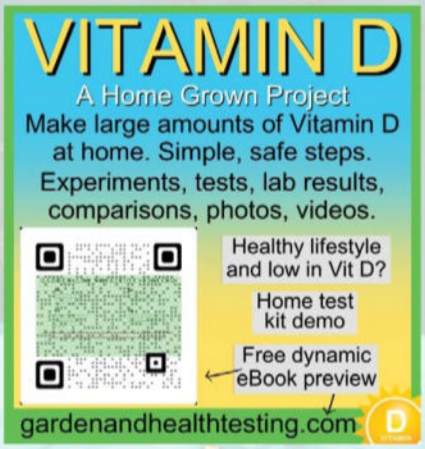

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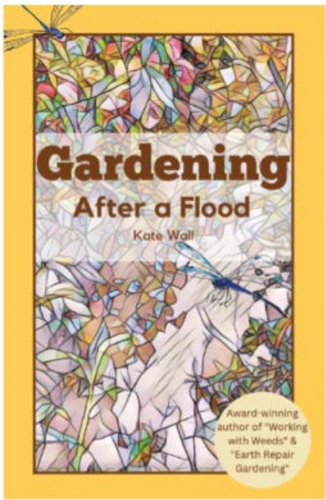
Latest reads

REVIEWED BY PHILIPPA JAMIESON

Gardening After a Flood

Kate Wall
The Gardener's Wall, 2022


Gardening
After a Flood
Kate Wall
Award-winning author of "Working with Weeds" & "Earth Repair Gardening"

This timely book is available free to download from the author's website. Brisbane gardener Kate Wall draws from her experiences of many flooded gardens, including her own in 2011 and 2022.

She offers practical advice for restoring home gardens after flooding, from the clean-up phase to several months down the track. There's everything from hazard identification (and prevention), to recognising plant damage from waterlogging, and restoring the microbes in the soil.

The author recommends adding microbes and rock minerals containing silica, and using fungicides to prevent root rot – there are certified organic input products available. It's an Australian book but most of it applies in Aotearoa, and would also be useful for people with larger blocks.

Download from katewall.com.au

The Everyday Herbalist

The Essential Guide to Growing & Using Herbs in Aotearoa
Jane Wrigglesworth
Allen & Unwin, 2023

The Essential Guide to Growing & Using Herbs in Aotearoa
The Everyday Herbalist
Jane Wrigglesworth

For anyone wanting a handy New Zealand herbal reference book, this is an accessible yet comprehensive guide. It covers everything from growing herbs to the medicinal, culinary, nutritional and cosmetic uses of introduced and native herbs.

After listing her 30 must-have herbs, the author introduces many more in chapters on making things such as herbal teas, salves, lip balm, and natural cleaners. There are sections on herbs for first aid, sleep and relaxation, gut health, coughs and colds, and revitalising herbs.

Be adventurous and try the recipes for holy basil chai, fresh coriander chutney, rosemary and kawakawa hash browns! Or how about oregano and lavender flowing soap?

All in all this is a great primer for people who want to grow or use herbs in any way.

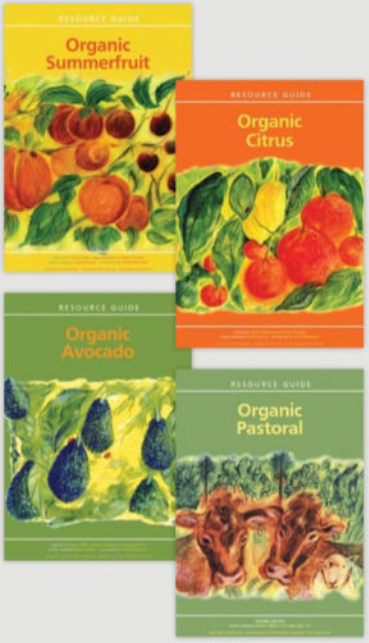
Resource Guides for organics

Visit organicnz.org.nz/shop/ to buy

These guides are not a step-by-step 'how-to' of converting to organics, but a living resource of existing knowledge, presented from a practical perspective. There is both organic and biodynamic information available for you to take that which is relevant to your growing journey.

Printed by Soil & Health NZ and the Biodynamic Association, the guides are aimed at key sectors of organic growing: Pastoral (Dairy), Citrus, Avocado, and Summerfruit. Each guide is multi-authored by experts in each field. Site design, soil health, and crop management are just some of the topics explored in the three growing guides and, at over 140 pages, the Pastoral Guide is a veritable textbook designed for organic farmers.

Guides available at organicnz.org.nz for $20-$30.


RESOURCE GUIDE
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RESOURCE GUIDE
Organic Citrus
RESOURCE GUIDE
Organic Avocado
RESOURCE GUIDE
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START DATE: Monday 17th July 2023

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PROGRAMME LENGTH:
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Biological Husbandry Unit
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